

APPENDIX G
AIR QUALITY DATA AND MODELING PROTOCOL

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APPENDIX G1

UPDATED INFORMATION REGARDING MODELING PROTOCOL

----- Forwarded by Mark Strehlow/Oakland/URSCorp on 05/29/2001 03:23 PM -----

Robert Hughes

<rhughes@arb.ca.gov>

05/22/2001 08:53 AM

To: Mark_Strehlow@URSCorp.com, Brent_Eastep <Brent_Eastep@URSCorp.com>
cc: Michael Tollstrup <mtollstr@arb.ca.gov>, Keith Golden
<kgolden@energy.state.ca.us>, bohnenkamp.carol@epa.gov
Subject: Re: Reliant Colusa Power Plant Met Data

The Air Resources Board's Modeling Support Section (MSS) has reviewed the proposal to use meteorological data from Maxwell for the years 1996 and 1999 for the ambient air quality impact analysis for the Colusa Power Plant Project. While five years of consecutive meteorological data is preferred, as outlined in United States Environmental Protection Agency guidelines, the proposal to use two years of non-consecutive data from Maxwell is acceptable because five years of consecutive meteorological data are not available. If there are any questions, please call me at (916) 327-5608.

Mark_Strehlow@URSCorp.com wrote:

> All:
>
> The applicant proposes to use meteorological data from Maxwell for the
> years 1996 and 1999 for the modeling. This is the best data available to
> represent the project site after considering: site location relative to the
> proposed source, percent of data captured on an annual basis, influence of
> terrain on wind vectors at alternative sites, frequency of instrument
> calibration, and type of data recorded.
>
> Maxwell is the closest met site of any considered. The years 1996 (at 94.9
> % data capture) and 1999 (99.8%) are the only two years out of the five
> years received that have data capture >90%. Others are 1997 (44.6%), 1998
> (75.9%) and 2000 (88.9%). Guidance found in Meteorological Guidance for
> Regulatory Modeling Applications (EPA-454/R-99-005), Feb. 2000, section
> 6.8, precludes inclusion of other sites' data to obtain >90% capture.
>
> After review of the Arbuckle site wind rose information, it appears
> dissimilar enough from Maxwell to not appear technically justifiable to
> substitute Arbuckle data into the Maxwell data to fill 1999 and 1996 data
> gaps. Therefore, we propose to fill the gaps in the Maxwell data using the
> procedures in section 6.8 of the above mentioned resource.
>
> The ARB AAQMS Willows site met data was also considered. The ARB site
> performs instrument calibrations twice a year which is once per year better
> than Maxwell. However, Willows data was not acceptable because this site
> does not report sigma theta or other means of determining stability class.
> Maxwell does report sigma theta. Maxwell, Arbuckle and Willows all use 10
> meter towers.
>
> Consistent with the use of less than five years of data we will drop the

> H6H approach for 24-hour PM10 and use H1H.
>
> Thank you all for your time and efforts is shaping this meteorological data
> selection. We look forward to working with you on this project.
>
> Regards,
>
> Mark Strehlow
> URS Corporation
> (510) 874-3055

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needs to take immediate action to reduce energy consumption. For
a list of simple ways you can reduce demand and cut your energy
costs, see our Web-site at www.arb.ca.gov."



rjhughes.vcf

APPENDIX G2
MODELING PROTOCOL

MODELING PROTOCOL FOR THE COLUSA POWER PLANT PROJECT

COLUSA COUNTY, CALIFORNIA

Prepared for

Reliant Energy

April 17, 2001

URS

500 12th Street, Suite 200
Oakland, California 94607

**MODELING PROTOCOL FOR THE
COLUSA POWER PLANT PROJECT**

COLUSA COUNTY, CALIFORNIA

Prepared for:

Reliant Energy

Prepared by:

URS Corporation
500 12th Street, Suite 200
Oakland, California 94607

April 17, 2001

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ACRONYMS

$\mu\text{g}/\text{m}^3$	micrograms per cubic meter
μm	Micrometers
AB	Assembly Bill
AFC	Application for Certification
AOI	area of impact
AQRV	Air Quality Related Values
ARB	California Air Resources Board
ARM	ambient ratio method
BACM	best achievable control measures
BACT	Best Available Control Technology
CCAPCD	Colusa County Air Pollution Control District
CEC	California Energy Commission
CO	carbon monoxide
CTG	combustion turbine generator
FDM	Fugitive Dust Model
g/s	gram per second
H1H	high first high
H2H	high second high
H6H	highest sixth high
HRA	health risk assessment
HRSG	heat recovery steam generator
ISC	Industrial Source Complex
km	Kilometers
LORS	laws, ordinances, regulations, and standards
MEI	Maximally Exposed Individual
MW	molecular weight
NAAQS	National Ambient Air Quality Standards
NAAQS/CAAQS	National Ambient Air Quality Standards/California Ambient Air Quality Standard
NO _x	nitrogen oxides
NSR	New Source Review

ACRONYMS (Continued)

OLM	ozone limiting method
PAH	polycyclic aromatic hydrocarbons
PM ₁₀	particulate matter less than 10 µm in diameter
PSD	Prevention of Significant Deterioration
SCR	selective catalytic reduction
SCRAM	Support Center for Regulatory Air Models
SO ₂	sulfur dioxide
TACs	toxic air contaminants
T-BACT	best available control technology for toxics
TPY	tons per year
U.S. EPA	U. S. Environmental Protection Agency
VOC	volatile organic compounds
ZOI	Zone of Impact

1.0 INTRODUCTION

1.1 Background

Reliant Energy is proposing to build and operate a 630 megawatt (MW) natural gas-fired combined cycle plant in Colusa County, California (Figure 1-1). The project is subject to the site licensing requirements of the California Energy Commission (CEC). The CEC will coordinate its independent air quality evaluations with the Colusa County Air Pollution Control District (CCAPCD) through the Determination of Compliance (DOC) process and with the United States Environmental Protection Agency's (U.S. EPA) Prevention of Significant Deterioration (PSD) review.

Federal PSD regulations apply only to those pollutants that are in attainment of the National Ambient Air Quality Standards (NAAQS). State and local non-attainment new source review (NSR) regulations potentially apply to all criteria pollutants, depending on the quantity of pollutants emitted. The area around the proposed Colusa Power Plant is non-attainment for the California Ambient Air Quality Standards (CAAQS) for particulate matter less than 10 micrometers (μm) in diameter (PM_{10}) and ozone. All other pollutants are not classified or classified as attainment.

1.2 Purpose

The use of dispersion modeling is required to demonstrate compliance with applicable air quality standards, PSD increments and impacts on visibility in nearby (within 100 kilometers [km]) federal Class I wilderness areas. Modeling will also be required to determine the potential impacts on human health from toxic air contaminants. Finally, CEC siting regulations also require that the cumulative impacts of the proposed project and reasonably foreseeable projects within 10 km of the project site be assessed via modeling.

This document summarizes the procedures to be used for the air dispersion modeling for project certification and permitting. Modeling of both operation and construction emissions will be performed in accordance with CEC guidance (CEC, 1997). The proposed model selection and modeling approach is based on review of applicable regulations and agency guidance documents, and discussions with agency staff.



Source: Berndtson & Berndtson, California North Road Map

0 15 30

Scale in Miles
1:1,200,000

REGIONAL LOCATION MAP

Colusa Power Plant
Reliant Energy
Colusa County, California
43-00066841.00

URS

FIGURE 1-1

2.0 PROJECT DESCRIPTION

2.1 Project Location

The Colusa Power Plant project site will be located approximately 15 miles north of Colusa, California (see Figure 1-1). The project site is located within approximately 1 mile of complex terrain (i.e., with elevation exceeding proposed stack heights) and is surrounded by rural land use.

2.2 Description Of The Proposed Source

The Colusa Power Plant facility will include two trains with dry cooling, transformers, control and administrative buildings, ammonia storage tanks, and other ancillary facilities. Each train will consist of a natural gas-fired "7F" technology combustion turbine – generator (CTG) set and a supplementary fired heat recovery steam generator (HRSG) equipped with selective catalytic reduction (SCR) for the control of nitrogen oxides (NO_x) and an oxidation catalyst for control of carbon monoxide (CO) emissions. Natural gas will be the only fuel used by the CTGs. The trains will be combined cycle configurations and will include a single steam turbine with other ancillary components typical of a combined cycle power plant. Each CTG will be nominally rated at 175 MW and the steam turbine will be rated at 280 MW.

3.0 REGULATORY SETTING

3.1 California Energy Commission Requirements

For projects with electrical power generation capacity of greater than 50 MW, CEC requires that applicants prepare a comprehensive Application for Certification (AFC) document addressing the project's environmental and engineering features. An AFC must include the following air quality information (CEC, 1997):

- A description of the project, including project emissions, fuel type(s), control technologies and stack characteristics;
- The basis for all emission estimates and/or calculations;
- An analysis of Best Available Control Technology (BACT) according to CCAPCD Rules;
- Existing baseline air quality data for all regulated pollutants;
- Existing meteorological data, including temperature, wind speed and direction and mixing height;
- A listing of applicable laws, ordinances, regulations and standards (LORS) and a determination of compliance with all applicable LORS;
- An emissions offsets strategy;
- An air quality impact assessment (i.e., federal and state ambient air quality standards and PSD review) and protocol for the assessment of cumulative impacts of the proposed project along with permitted and under construction projects within a 10 km radius; and
- An analysis of human exposure to air toxics (i.e., health risk assessment [HRA]).

For the Colusa Power Plant project, the air quality impact assessment, the cumulative impacts assessment, and the HRA will be performed using dispersion models.

3.2

U.S. Environmental Protection Agency Requirements

United States EPA has promulgated PSD regulations applicable in Colusa County. Many of the PSD requirements are the same as the AFC and NSR requirements described above (e.g., project description, BACT, ambient air quality standards analysis); however, PSD requires the following additional analyses:

- A PSD increment (consumption) analysis;
- An analysis of Air Quality Related Values (AQRV) to ensure the protection of visibility of federal Class I wilderness areas within 100 km of the proposed project;
- An evaluation of potential impacts on soils and vegetation of commercial and recreational value; and
- An evaluation of potential growth-inducing impacts.

For the Colusa Power Plant project, a visibility analysis will not be performed because there are no Class I areas within 100 km of the proposed project site.

This section describes the dispersion models and modeling techniques to be used in performing the air quality analysis for the Colusa Power Plant project. The objectives of the modeling are to demonstrate that air emissions from the Colusa Power Plant project will not cause or contribute to a PSD increment exceedance or an ambient air quality standard violation and will not cause a significant health risk.

Screening Modeling

An initial screening analysis will be conducted to identify which turbine operating mode results in worst-case ambient air impacts. The most recent version of U.S. EPA's Industrial Source Complex (ISC) model (Version 00101) will be used to model worst-case conditions for each operating mode (100%, 80%, or 60%). A unit emission rate of 1.0 gram per second (g/s) will be modeled for both flat and elevated terrain while considering potential building downwash. Concentrations for each pollutant, expressed in terms of micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), will be obtained by multiplying the unit emission rate from the ISCST3 model results (expressed in terms of $\mu\text{g}/\text{m}^3$ per g/s) by the emission rate calculated for each pollutant (expressed in terms of g/s) for each operating mode. The operating mode that yields the highest concentrations will be considered the worst-case operating mode. The operating mode that yields the highest ISCST3 results (expressed in terms of $\mu\text{g}/\text{m}^3$ per g/s) will be used to simulate start-up stack conditions. The worst-case operating modes described above will be used in all modeling analyses. The screening modeling will consider fumigation using the U.S. EPA SCREEN3 model.

Screening modeling will not be used to eliminate pollutants from refined modeling analysis.

4.2

Refined Modeling

The purpose of the refined modeling analysis is to demonstrate that air emissions from the Colusa Power Plant project will not cause or contribute to a PSD increment exceedance or a NAAQS/CAAQS violation; will not cause a significant health risk impact; and will not negatively impact visibility in a Class I area under worst-case conditions. ISCST3 will be used for the refined modeling. The regulatory default option will be selected and run in the rural mode. Specific modeling techniques for PSD, NAAQS/CAAQS, HRA, and AQMV/visibility analyses are discussed below.

4.2.1

Area of Impact Analysis

Ground level concentrations caused by the project will be compared to ambient air quality impact significance levels defined by U.S. EPA (Table 4-1). If maximum off-property pollutant concentrations for each pollutant are below these levels, then the project will not cause significant air quality impacts, and no further modeling will be performed.

If the predicted ambient concentrations for the project are above ambient air quality impact significance levels, an area of significant impact will be defined for each pollutant and averaging period for which significance levels are exceeded. The receptor locations and time periods where the project has a significant impact constitute *significant events*. The AOI is the area having a radius equal to the distance to the significant event located farthest from the project. The largest radius for each pollutant, regardless of averaging period, will be used to define the AOI for the remainder of the analysis. For example, CO has both 1-hour and 8-hour averaging periods; therefore, the short-term AOI would be defined as the area having a radius equal to the distance from the project to either the 1-hour or 8-hour significant event, whichever is longer.

4.2.2

PSD Increment Analysis

The purpose of the PSD increment analysis is to determine whether the Colusa Power Plant project will cause or contribute to a predicted PSD increment exceedance. The PSD

increments are shown in Table 4-1. United States EPA guidance states that increment consumption should generally be based on changes in *actual* emissions reflected by the normal source operation for a period of two years (U.S. EPA, 1990a). The following approach is proposed for performing the PSD increment analysis:

1. A PSD increment receptor grid will be developed for each pollutant and averaging period, for each of the five meteorological years, by analyzing the maximum concentration at each receptor from the AOI analysis. Only those receptors from the AOI analysis that have at least one predicted significant event will be included in the PSD increment analysis.
2. For short-term modeling, the MAXFILE output option will be invoked to save any events that exceed 100% of the PSD increment. The PLOTFILE output will also be used to identify the receptors, if any, having high second-high events (H2H) that exceed 100% of the PSD increment. The PLOTFILE output will also be used to identify the receptors, if any, having concentrations greater than 100% of the applicable PSD increment. If concentrations do not exceed 100% of the applicable PSD increment, compliance with the applicable PSD increment is demonstrated and no further modeling is necessary.
3. The H2H events that exceed 100% of the PSD increment will be rerun to determine if the project has a significant event during a predicted PSD increment exceedance event. The ISCST3 model will be used to analyze short-term events. ISCST3 with the PERIOD option will be used to analyze annual events. If the project does not have a significant impact during these exceedance events, compliance with PSD increments is demonstrated and no further modeling is necessary.
4. If predicted exceedances are encountered for which the project has a significant impact, receptor locations will be analyzed to determine if they are located within another modeled facility's boundaries. The corresponding facility's contribution to the maximum concentration at that receptor will be determined and subtracted (from the concentration modeled at that receptor). If the revised total predicted impact at these receptors is below the PSD increment, compliance with PSD increments is demonstrated for the project and no further analysis is necessary.
5. For any remaining events, a culpability analysis using ISCST3 will be performed to identify the sources having the greatest impact, and determine if these are project sources or off-property sources. For any culpable project sources, the modeling inventory, including source locations and stack parameters used to estimate emissions, will be

reviewed to ensure they are reasonable. Adjustments will be made as appropriate.

6. An ISCST3 run will be performed with the revised inventory in (5) above. If no PSD increment exceedance is predicted then compliance with PSD increments is demonstrated and no further modeling is necessary.

Table 4-1 Relevant Ambient Air Quality Standards and Significance Levels

Pollutant	Averaging Time	CAAQS ^(a,c)	NAAQS ^(b,c)	Ambient Impact Significance	PSD Significant Emission Rates (TPY)	PSD Increments ($\mu\text{g}/\text{m}^3$)	
				Levels ($\mu\text{g}/\text{m}^3$)	Class I	Class II	
Carbon Monoxide	8-hour	9.0 ppm (10,000 $\mu\text{g}/\text{m}^3$)	9.0 ppm (10,000 $\mu\text{g}/\text{m}^3$)	500	100		
	1-hour	20 ppm (23,000 $\mu\text{g}/\text{m}^3$)	35 ppm (40,000 $\mu\text{g}/\text{m}^3$)	2,000			
Nitrogen Dioxide ^(d)	Annual		0.053 ppm (100 $\mu\text{g}/\text{m}^3$)	1	40	2.5	25
	1-hour	0.25 ppm (470 $\mu\text{g}/\text{m}^3$)					
Sulfur Dioxide	Annual		0.03 ppm (80 $\mu\text{g}/\text{m}^3$)	1	40	2	20
	24-hour	0.04 ppm ^(e) (105 $\mu\text{g}/\text{m}^3$)	0.14 ppm (365 $\mu\text{g}/\text{m}^3$)	5		5	91
	3-hour			25		25	512
PM ₁₀	1-hour	0.25 ppm (655 $\mu\text{g}/\text{m}^3$)					
	Annual	30 $\mu\text{g}/\text{m}^3$	50 $\mu\text{g}/\text{m}^3$	1	15	4	17
Ozone	24-hour	50 $\mu\text{g}/\text{m}^3$	150 $\mu\text{g}/\text{m}^3$	5		8	30
	1-hour	0.09 ppm (180 $\mu\text{g}/\text{m}^3$)	0.12 ppm (235 $\mu\text{g}/\text{m}^3$)	See footnote ^(f)	40 (of VOCs)		
Visibility Reducing Particles	I observation	See footnote ^(g)					

a California standards for ozone (as volatile organic compounds, carbon monoxide, sulfur dioxide (1-hour), nitrogen dioxide, and PM₁₀, are values that are not to be exceeded. The visibility standard is not to be equaled or exceeded.

b National standards, other than those for ozone and based on annual averages, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.

c Concentrations are expressed first in units in which they were promulgated. Equivalent units are given in parentheses and based on a reference temperature of 25° C and a reference pressure of 760 mm of mercury. All measurements of air quality area to be corrected to a reference temperature of 25° C and a reference pressure of 760 mm of mercury (1,013.2 millibar).

d Nitrogen dioxide (NO₂) is the compound regulated as a criteria pollutant; however, emissions are usually based on the sum of all oxides of nitrogen (NO_x).

e At locations where the state standards for ozone and/or PM₁₀ are violated. National standards apply elsewhere.

f Modeling is required for any net increase of 100 tons per year or more of VOCs subject to PSD.

g In sufficient amount to reduce the prevailing visibility to less than 10 miles when the relative humidity is less than 70%. "Prevailing visibility" is defined as the greatest visibility, which is attained or surpassed around at least half of the horizon circle, but not necessarily in continuous sectors.

Blanks = Not applicable

ppm = parts per million by volume, or micromoles of pollutant per mole of gas

CAAQS = California Ambient Air Quality Standard

PM₁₀ = particulate matter less than 10 micrometers in diameter

mm = millimeters

TPY = ton per year

NAAQS = National Ambient Air Quality Standard

$\mu\text{g}/\text{m}^3$ = micrograms per cubic meter

4.2.3 Ambient Air Quality Standard Analysis

The purpose of the ambient air quality standard analysis is to determine whether the Colusa Power Plant project will cause or contribute to a NAAQS/CAAQS violation. The project will not be considered to cause or contribute to a NAAQS/CAAQS violation unless impacts from the project itself combined with the background concentration exceed the NAAQS/CAAQS, or the project has a significant impact at the same location and time as a predicted NAAQS/CAAQS violation. The following approach is proposed for performing the NAAQS/CAAQS analysis:

1. The same receptor grid generated for the PSD increment analysis will be used for the NAAQS/CAAQS analysis (see Item 1 in Section 4.2.2).
2. Short-term and annual NAAQS/CAAQS modeling will be performed using ISCST3. Annual NAAQS/CAAQS modeling will be performed using ISCST3 with the PERIOD option. Both short-term and annual analyses will be run using meteorological data for five years. For short-term standards, one exceedance is allowed per year; the second is a violation. Therefore, the maximum impact (i.e., high first high [H1H]) can exceed a short-term standard; however, a H2H concentration must be below the standard or a violation exists and further analysis is required. Maximum impact equals modeled impact plus background.

For CO modeling, the PLOTFILE output option in ISCST3 will be invoked to save any H2H events that, when added to background, exceed the NAAQS/CAAQS. If 1-hour and 8-hour concentrations do not exceed the NAAQS/CAAQS, then compliance is demonstrated and no further modeling is necessary for CO.

For NO₂ modeling, the PLOTFILE output option in ISCST3 will be invoked to save any H2H events that exceed the NAAQS/CAAQS (minus background). Initially, the modeling will assume full conversion of NO_x to NO₂. Should it be required, NO₂ estimates will be reduced using either U.S. EPA's ambient ratio method (ARM) (for annual impacts only) or ozone limiting method (OLM) (for hourly impacts). Initial refined modeling will use U.S. EPA's 0.75 default ambient ratio. If the 0.75 default ambient ratio yields a concentration that still exceeds the standard, an alternative ratio will be developed based on historic ambient NO₂/NO_x concentrations for the local area. If this approach is still not adequate, the OLM will be used. If 1-hour and annual concentrations do not exceed the applicable NAAQS/CAAQS, then compliance is demonstrated and no

further modeling is necessary for NO₂.

For SO₂ modeling, the PLOTFILE output option in ISCST3 will be revoked to save any H2H events that, when added to background exceed the NAAQS/CAAQS. If 3-hour and 24-hour concentrations do not exceed the NAAQS/CAAQS, then compliance is demonstrated and no further modeling is necessary for SO₂.

For PM₁₀ modeling, the MULTYEAR processing option will be invoked in order to determine the 24-hour, highest sixth high (H6H) concentration at each receptor over the five years modeled for comparison, when added to background, to the 24-hour NAAQS/CAAQS. Annual concentrations will be determined by averaging each of the five PLOTFILE outputs for each receptor for the PERIOD average in order to obtain the five-year average concentration at each receptor. If concentrations do not exceed the NAAQS/CAAQS (minus background), then compliance is demonstrated and no further modeling is necessary for PM₁₀.

3. The events exceeding the NAAQS/CAAQS will be rerun to determine if the project has a significant event during a predicted CAAQS or NAAQS exceedance event. The ISCST3 model will be used to analyze short-term events. ISCST3 will be used to analyze annual events. If the project does not have a significant impact during these exceedance events, then NAAQS/CAAQS compliance is demonstrated and no further modeling is necessary.
4. If the project has a significant event during a NAAQS/CAAQS exceedance event, then the subject receptor locations will be analyzed to determine if they reside within another facility's boundary. The corresponding facility's contribution to the maximum concentration at that receptor will be determined and subtracted from the concentration modeled at that receptor. If the revised total predicted impact at the receptor is below the NAAQS/CAAQS, then compliance is demonstrated and no further analysis is necessary for PM10.
5. For any remaining events, a culpability analysis using ISCST3 will be performed to determine which sources contribute the greatest impact. These sources may then be updated by contacting the facility owning the source and verifying the source's input parameters. For any culpable project sources, the modeling inventory, including source locations and stack parameters used to estimate emissions, will be reviewed to ensure they are reasonable. Adjustments will be made as appropriate.
6. An ISCST3 run will be performed using the revised inventory in (5) above to determine if the NAAQS/CAAQS exceedance still exists. If no NAAQS/CAAQS exceedance exists, then NAAQS/CAAQS compliance is demonstrated and no further modeling is necessary.

4.2.4 Health Risk Assessment Analysis

The HRA approach will be consistent with the methods outlined in the *Air Toxics Hot Spots Program, Revised 1992 Risk Assessment Guidelines* (CAPCOA, 1993). Contaminants with potential carcinogenic, chronic and acute effects will be considered.

First, ground level impacts from the Colusa Power Plant project will be estimated using the ISCST3 atmospheric dispersion modeling. The ISCST3 modeling analysis will be consistent with the modeling approach discussed above for the NAAQS/CAAQS analyses. Based on impacts modeled using ISCST3, the ACE2588 model will be used to estimate health risk. The HRA will be performed to determine the following:

1. Define the location of the MEI (i.e., the location where the highest carcinogenic risk may occur);
2. Define the locations of the maximum chronic non-carcinogenic adverse health effects and the maximum acute adverse health effects; and
3. Calculate concentrations and adverse health effects at locations of maximum impact for each pollutant.

4.2.5 Air Quality Related Values and Visibility Analysis

Because there are no federal Class I wilderness areas within 100 kilometers of the Colusa Power Plant project, no visibility modeling will be performed.

4.3 Modeling Emissions Inventory

4.3.1 Project Sources

Operational emissions from the project will be dominated by the two combustion turbine-generators and two heat recovery steam generators. Table 4-2 summarizes preliminary annual (combined) emission estimates for the two CTG/HRSG trains. Conceptual plant design includes SCR for NO_x and oxidation catalysts for CO that will match recent BACT determinations for similar projects. Emissions of SO₂ and PM₁₀ will be low owing to the use of interstate pipeline natural gas as fuel.

Table 4-2. Preliminary Estimated Emissions for Colusa Power Plant Power Project Combustion Turbine-Generators and Heat Recovery Steam Generators (tons per year)

NO _x	CO	SO ₂	VOC	PM ₁₀	Pb
>40	>100	<40	>40	>15	<0.6

Combustion turbine generator/HRSG emissions will vary with ambient temperature and turbine load. Modeling will be conducted for a range of ambient temperatures and loads. All combinations will be modeled to identify worst-case operating scenarios for each averaging period (i.e., 1-hour, 3-hour, 8-hour, 24-hour, and annual). Startup and shutdown scenarios will be addressed. Refined emission estimates will be made after the plant design has been completed. Where applicable, emissions estimates will be provided in both ppm and pounds per hour values.

Emissions from the fire pump engine and auxiliary boiler will also be included based on an estimate of operating hours.

Temporary construction emissions will result from heavy equipment exhaust (i.e., NO_x emissions) and fugitive dust (i.e., PM₁₀) from earthmoving activities and vehicle traffic. However, construction emission impacts are expected to be small relative to the CTG/HRSG

emissions. For the Colusa Power Plant project, we will model the fugitive PM₁₀ emissions from construction using a spreadsheet version of the Fugitive Dust Model (FDM) (U.S. EPA, 1990b), and taking into account the affect of implementing best achievable control measures (BACM) for controlling fugitive dust during construction. We will model heavy equipment exhaust emissions using a refined modeling analysis with ISCST3.

Toxic air contaminants (TAC) also will be emitted from the Colusa Power Plant project due to combustion of natural gas. These emissions have not been estimated at this time; however, because only natural gas will be used as fuel, only small quantities of benzene, formaldehyde, and polycyclic aromatic hydrocarbons (PAH) may potentially be emitted. Emissions estimates for TAC will be based on emission factors and/or speciation profiles (for PM₁₀ and VOC) available from the California Air Resources Board (ARB) and/or vendor data, if available.

4.3.2 Off-Property Sources

If project impacts are significant, applicable modeling data (e.g., source location and emissions) for determining PSD increment and NAAQS impacts from all sources within a radius of the AOI plus 50 km (according to U.S. EPA, 1990a) as required will be requested from the CCAPCD. Some of these sources, as mentioned above, may be contemporaneous sources (i.e., scheduled to begin construction and/or operation during the same time frame as the Colusa Power Plant project).

4.4 Building Wake Effects

The effect of building wakes (i.e., downwash) upon the stack plumes will be evaluated in accordance with U.S. EPA guidance (U.S. EPA, 1985). Direction-specific building data will be generated for stacks below GEP stack height using U.S. EPA's Building Parameter Input Program (BPIP Version 95086). Appropriate information will be provided in the AFC and other permit applications that describes the input assumptions and output results from the BPIP

model. The ISCST3 model considers direction-specific downwash using both the Huber Snyder and Schulman-Scire algorithms as evaluated in the BPIP program.

4.5 Receptor Grid

This section presents the receptor grids that will be used in the modeling analyses.

4.5.1 AOI Analysis

The receptor grid to be used for determining the AOI is as follows:

- 30-meter spacing along the property line and extending from the property line out to 500 meters;
- 100-meter spacing within 500 to 1,000 meters;
- 250-meter spacing within 1 to 10 km of project sources; and
- 1,000 meter grid with 30-meter spacing around the two highest points of impact to determine the maximum impact.

4.5.2 PSD Increment Analysis

A PSD increment receptor grid will be developed for each of the five meteorological years and for each averaging period by analyzing the maximum concentration at each receptor from the AOI analysis. Only those receptors from the AOI analysis that had at least one predicted significant event would be included in the PSD increment analysis.

4.6 Meteorological and Ambient Air Quality Data

Meteorological data used in the dispersion modeling were obtained from the U.S EPA's Support Center for Regulatory Air Models (SCRAM) web site. Meteorological surface data from Redding, CA and upper air data from Oakland, CA were used for the years 1987 –

1991. The Redding data was chosen because five years of data was available and the data was considered representative of conditions at the project site in Colusa County. Two years of data from Red Bluff, CA was also available form the SCRAM website. A graph of average daily temperatures and quarterly and annual windroses for the Redding and Red Bluff meteorological data are included as Appendix A. A comparison of the Red Bluff and Redding data indicates that they are very similar. The Redding data was chosen for the modeling because there are five years of data available. We will work with CCAPCD staff to ensure the meteorological data are appropriate and accurate.

Available ARB meteorological data through 2000 (where available) will be used to estimate baseline ambient air pollutant concentrations. A number of monitoring stations near the project site will be evaluated on a pollutant by pollutant basis as potentially representative of site conditions, including:

- Colusa-Sunrise Blvd., Colusa County;
- Colusa-Fairgrounds, Colusa County;
- Willows-N Villa Avenue, Glenn County;
- Willows-E Laurel Street, Glenn County;
- Yuba City-Almond Street, Sutter County;
- Chico-Manzanita Avenue, Butte County;
- North Highlands, Sacramento County; and
- Del Paso Manor, Sacramento County.

5.0 MODELING RESULTS

5.1 Area Of Impact

Results of the AOI analysis will be presented in a summary table. The H1H concentration will be reported for all averaging periods for all years modeled. For years that exceed *de minimis* concentrations, a figure depicting the AOI will be generated. This figure will show the locations of all receptors that exceeded the *de minimis* concentration. The location and value of the maximum-modeled concentration will also be presented.

5.2 PSD Increments

Results of the PSD increment analyses will be presented in a summary table.

5.3 NAAQS and CAAQS Analysis

National Ambient Air Quality Standards/CAAQS analyses will be presented in a summary table. For CO, NO_x, and SO₂, the H2H short-term and highest annual concentrations will be reported. For PM₁₀, the H6H 24-hour concentration the highest (five-year average) concentration over the five years modeled will be presented. Background concentrations will be added to yield the total concentration, which will be compared to the NAAQS and CAAQS.

5.4 Health Risk Assessment Analysis

Area maps at an appropriate scale will depict the following data:

- Elevated terrain within a 10-mile radius of the project;
- Isopleths of any areas where exposures to air toxics lead to an estimated carcinogenic risk equal to or exceeding one in one million.

Health risk assessment modeling results will be summarized to include maximum annual and maximum-hourly concentrations from toxic air contaminant emissions that may

cause chronic adverse health effects (both carcinogenic and non-carcinogenic) and acute adverse health effects, respectively. Health effects will be calculated for the locations of maximum impact and presented in the summary table.

6.0

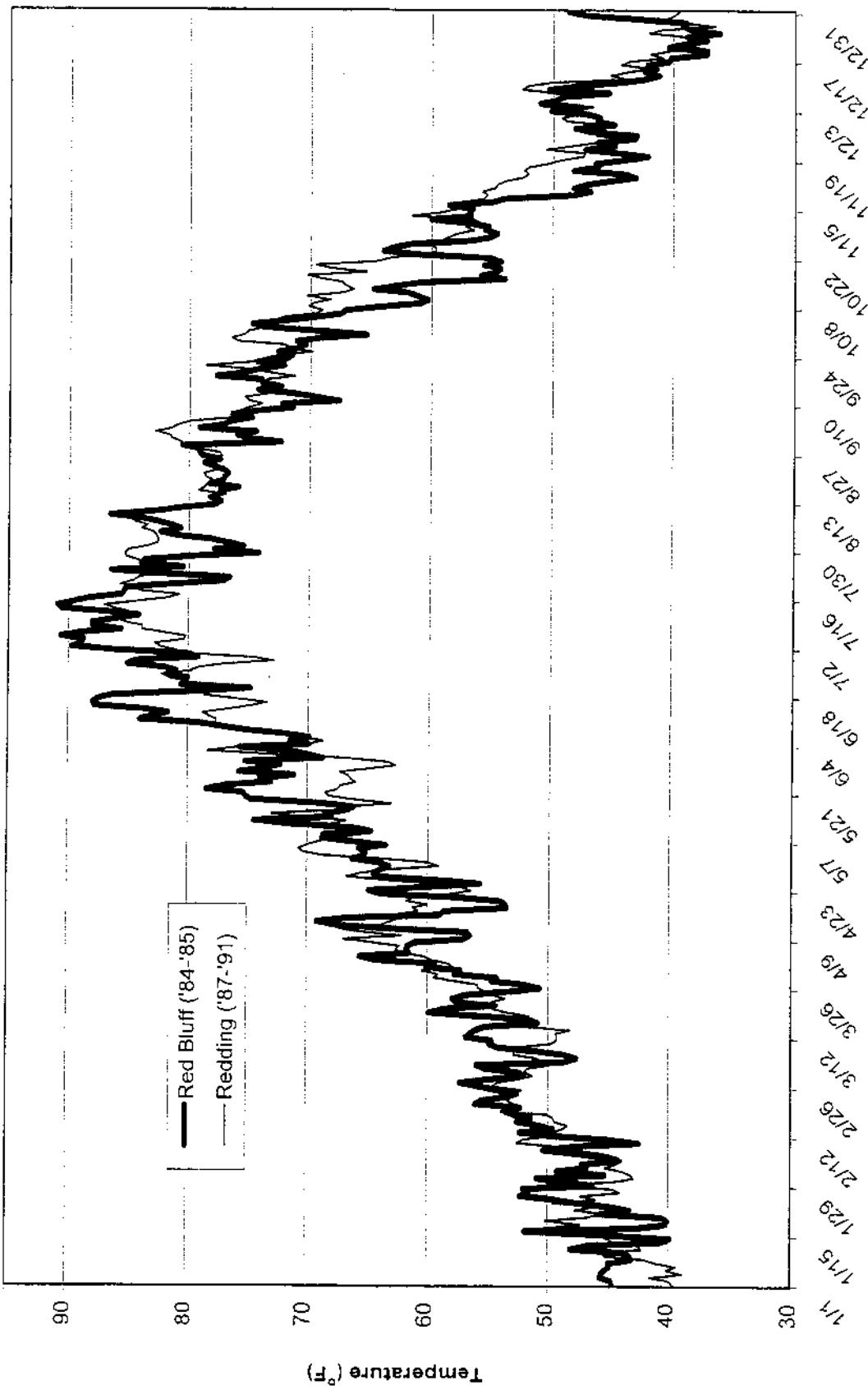
REFERENCES

- CAPCOA, 1993 *Air Toxics Hot Spots Program, Revised 1992 Risk Assessment Guidelines*, California Air Pollution Control Officers Association, October.
- CEC, 1997 "Regulations Pertaining to the Rules of Practice and Procedure and Plant Site Certification". *Title 20, California Code of Regulations*. Chapter 1, 2, 5.
- U.S. EPA, 1985 *Guideline for Determination of Good engineering Stack Height (Technical Support Document for the Stack Height Regulation) (Revised)*, EPA-450/4-80-023R. Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, NC 27711. June.
- U.S. EPA, 1990a *New Source Review Workshop Manual Prevention of Significant Deterioration and Nonattainment Area Permitting (Draft)*, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, NC 27711. October.
- U.S. EPA, 1990b *User Manual for PM₁₀ Open Fugitive Dust Source Computer Model Package*, EPA-450/3-90-010, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, NC, 27711. April.
- U.S. EPA, 1992 *Workbook for Plume Visual Impact Screening and Analysis (Revised)*, EPA-454/R-92-023, Office of Air and Radiation, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, NC 27711. October.
- U.S. Forest Service, 1992 *Guidelines for Evaluating Air Pollution Impacts on Class I Wilderness Areas in California*, General Technical Report PSW-GTR-136, U.S. Department of Agriculture, Forest Service. November.

APPENDIX A

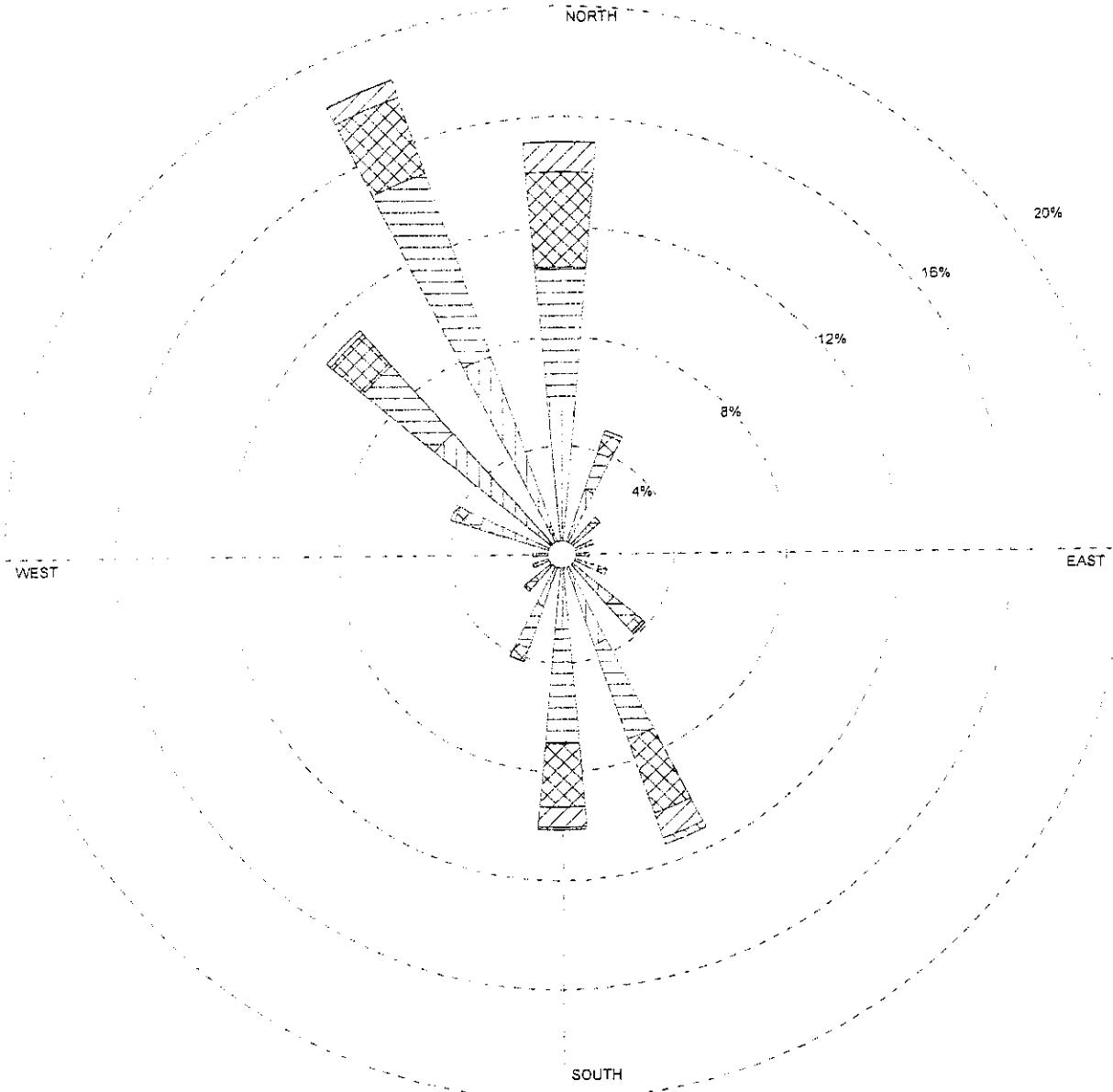
METEOROLOGICAL DATA COMPARISON

Average Daily Temperature Comparison



WIND ROSE PLOT

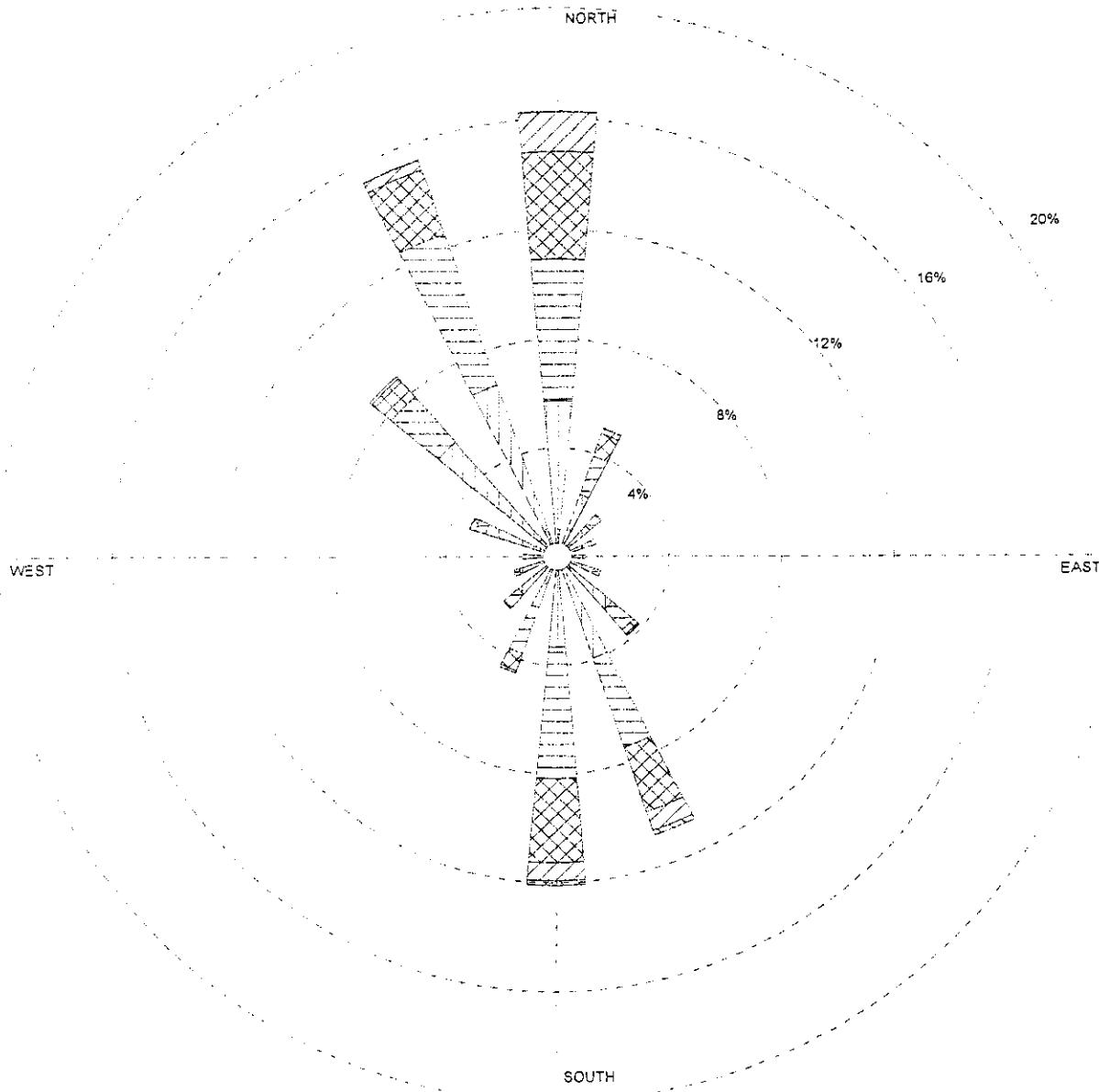
STATION #24216 - RED BLUFF/MUNICIPAL ARPT, CA



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/10/2001	
> 10.8	DISPLAY	COMMENTS
8.8-10.8	Wind Speed	m/s
5.7-8.8	Avg. Wind Speed	CALM WINDS
3.6-5.7	4.12 m/s	6.44%
2.1-3.6		
0.5-2.1	ORIENTATION Direction (blowing from)	PLOT YEAR-DATE-TIME PROJECT/PLOT NO.
		19 January 1 - December 31 Midnight - 11 PM annual1984

WIND ROSE PLOT

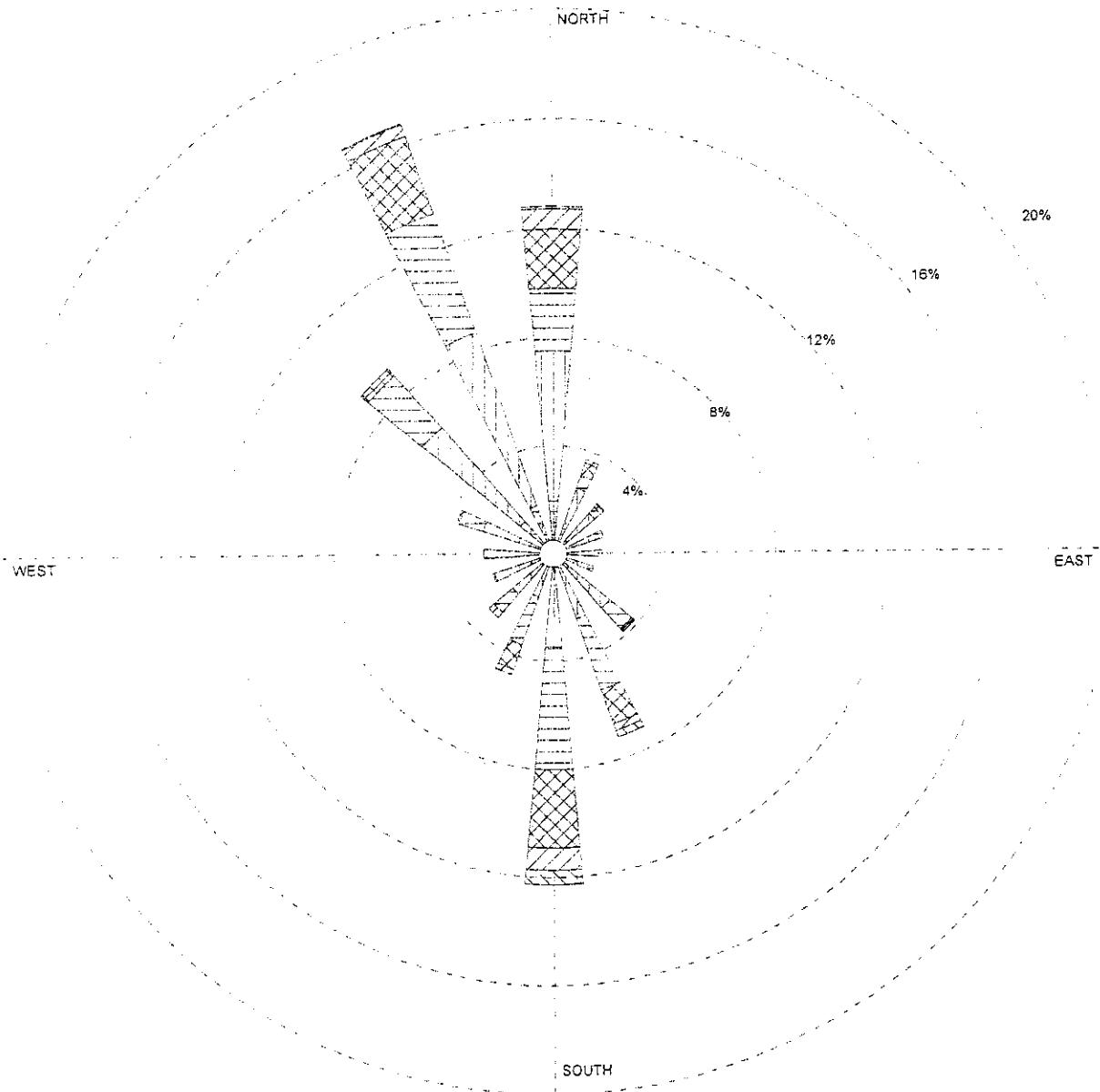
STATION #24216 - RED BLUFF/MUNICIPAL ARPT, CA



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/10/2001	
DISPLAY	UNIT	COMMENTS
> 10.8	m/s	
8.8-10.8		
5.7- 8.8	CALM WINDS	
3.6- 5.7	7.61%	
2.1- 3.6		
AVG. WIND SPEED		
0.5- 2.1	ORIENTATION	PROJECT/PLOT NO.
0.5- 2.1	Direction (blowing from)	19
		January 1 - December 31
		Midnight - 11 PM
		annual1985

WIND ROSE PLOT

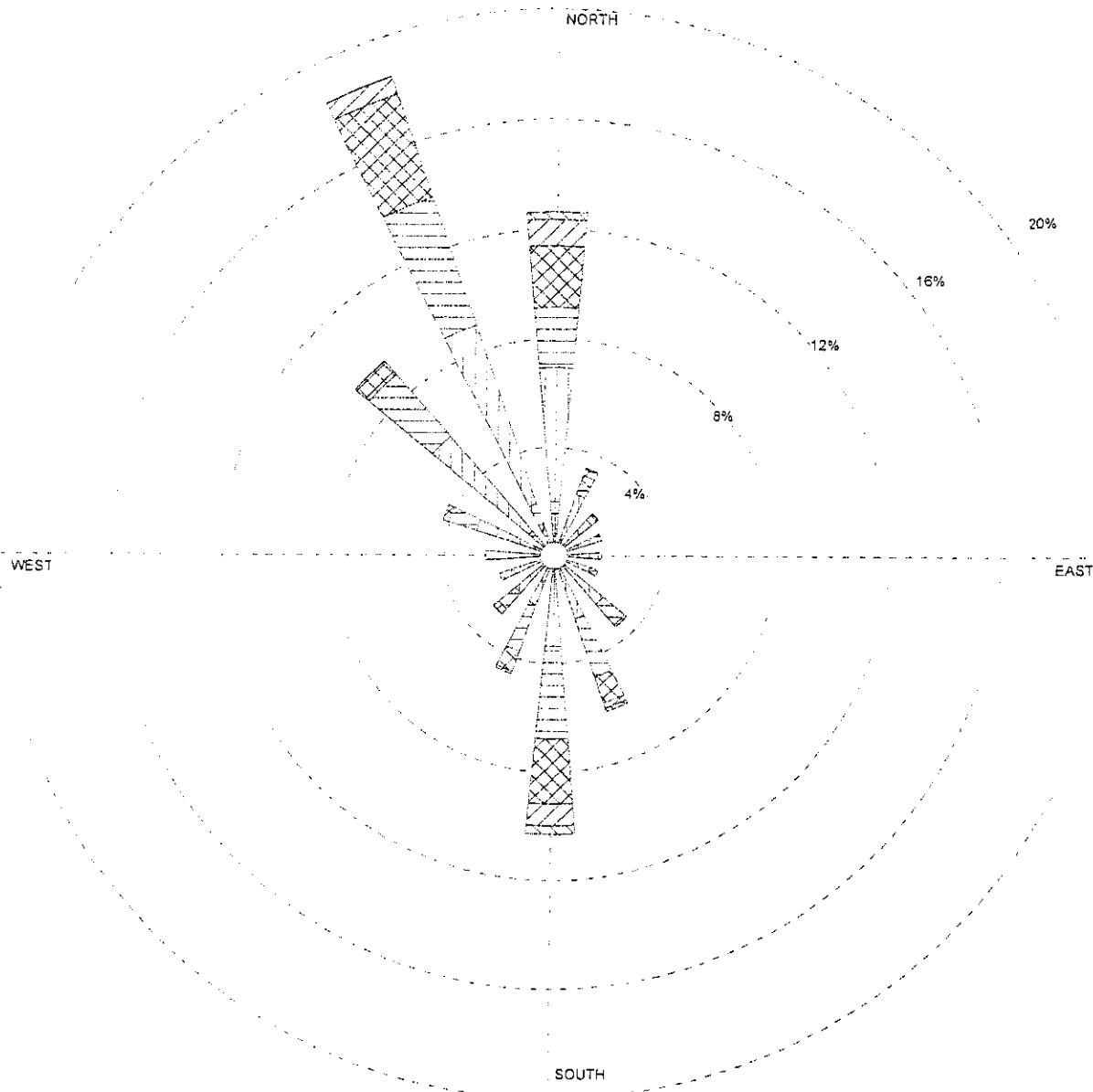
STATION #24257 - REDDING/AAF, CA



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/5/2001	
DISPLAY	UNIT	COMMENTS
> 10.8		
8-10.8	Wind Speed	m/s
5.7-8.8	AVG. WIND SPEED	CALM WINDS
3.6-5.7	3.73 m/s	9.29%
2.1-3.6		
0.5-2.1	ORIENTATION Direction (blowing from)	PLOT YEAR-DATE-TIME PROJECT/PLOT NO.
		19 January 1 - December 31 Midnight - 11 PM
		annual1987

WIND ROSE PLOT

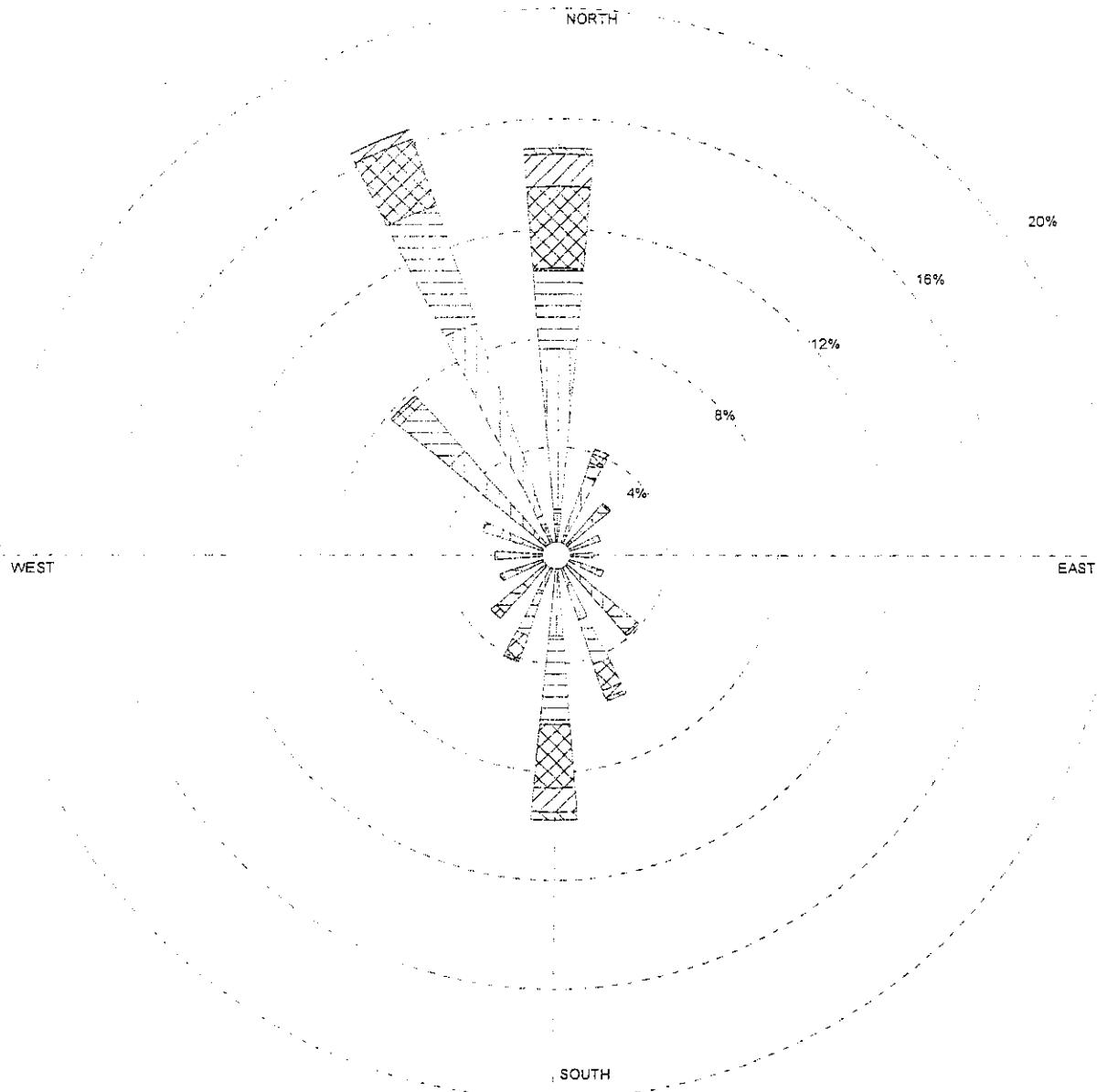
STATION #24257 - REDDING/AAF, CA



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/5/2001	
> 10.8	DISPLAY	COMMENTS
8.8-10.8	Wind Speed	m/s
5.7-8.8	Avg. Wind Speed	CALM WINDS
3.6-5.7	3.80 m/s	11.61%
2.1-3.6		
0.5-2.1	ORIENTATION Direction (blowing from)	PLOT YEAR-DATE-TIME 19 January 1 - December 31 Midnight - 11 PM
		PROJECT/PLOT NO. annual1988

WIND ROSE PLOT

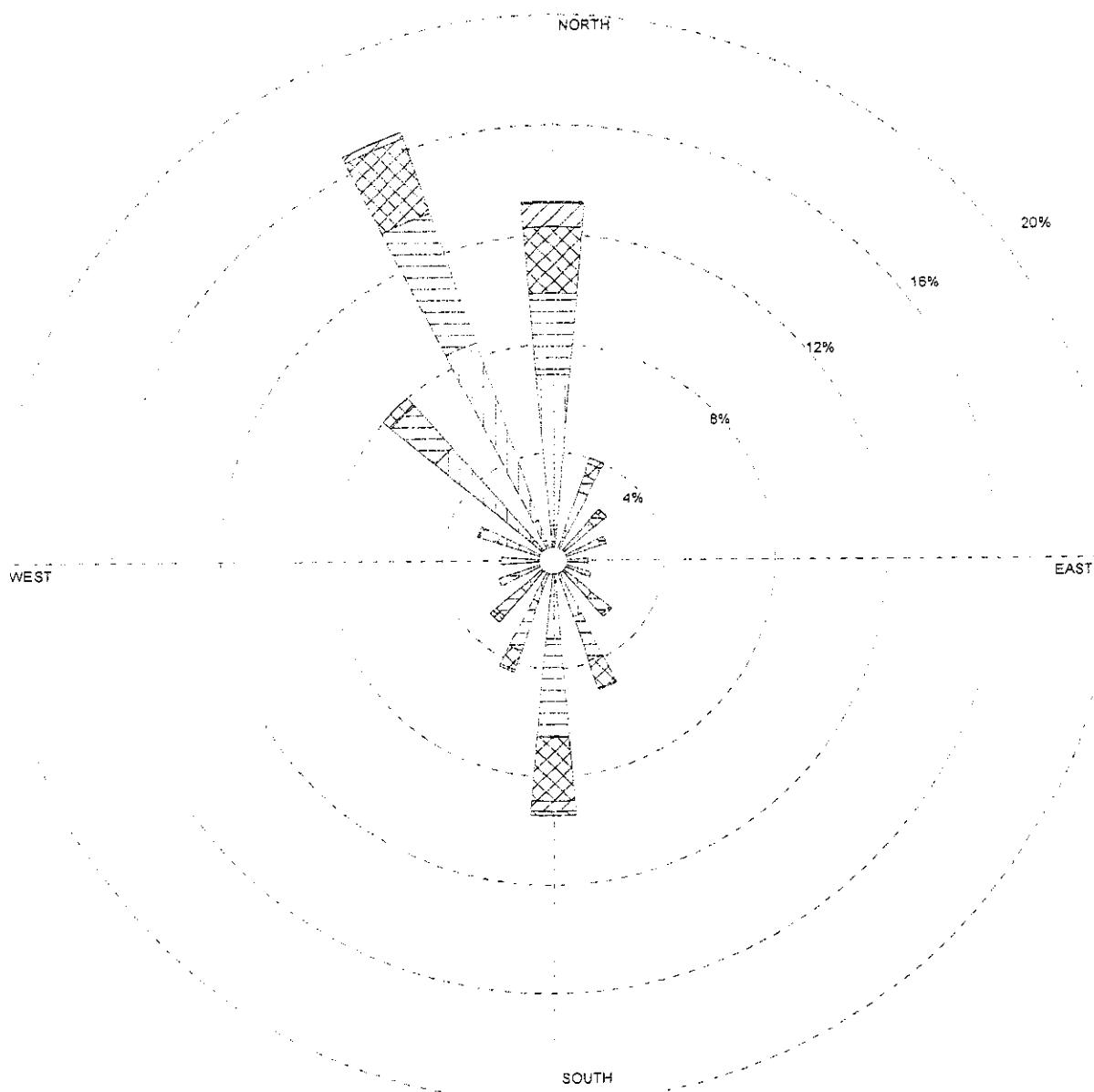
STATION #24257 - REDDING/AAF, CA



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/5/2001	
> 10.8	DISPLAY	COMMENTS
8.8-10.8	Wind Speed	m/s
5.7-8.8	Avg Wind Speed	CALM WINDS
3.6-5.7	3.76 m/s	14.35%
2.1-3.6		
0.5-2.1	ORIENTATION Direction (blowing from)	PLOT YEAR-DATE-TIME PROJECT/PLOT NO.
		19 January 1 - December 31 Midnight - 11 PM
		annual1989

WIND ROSE PLOT

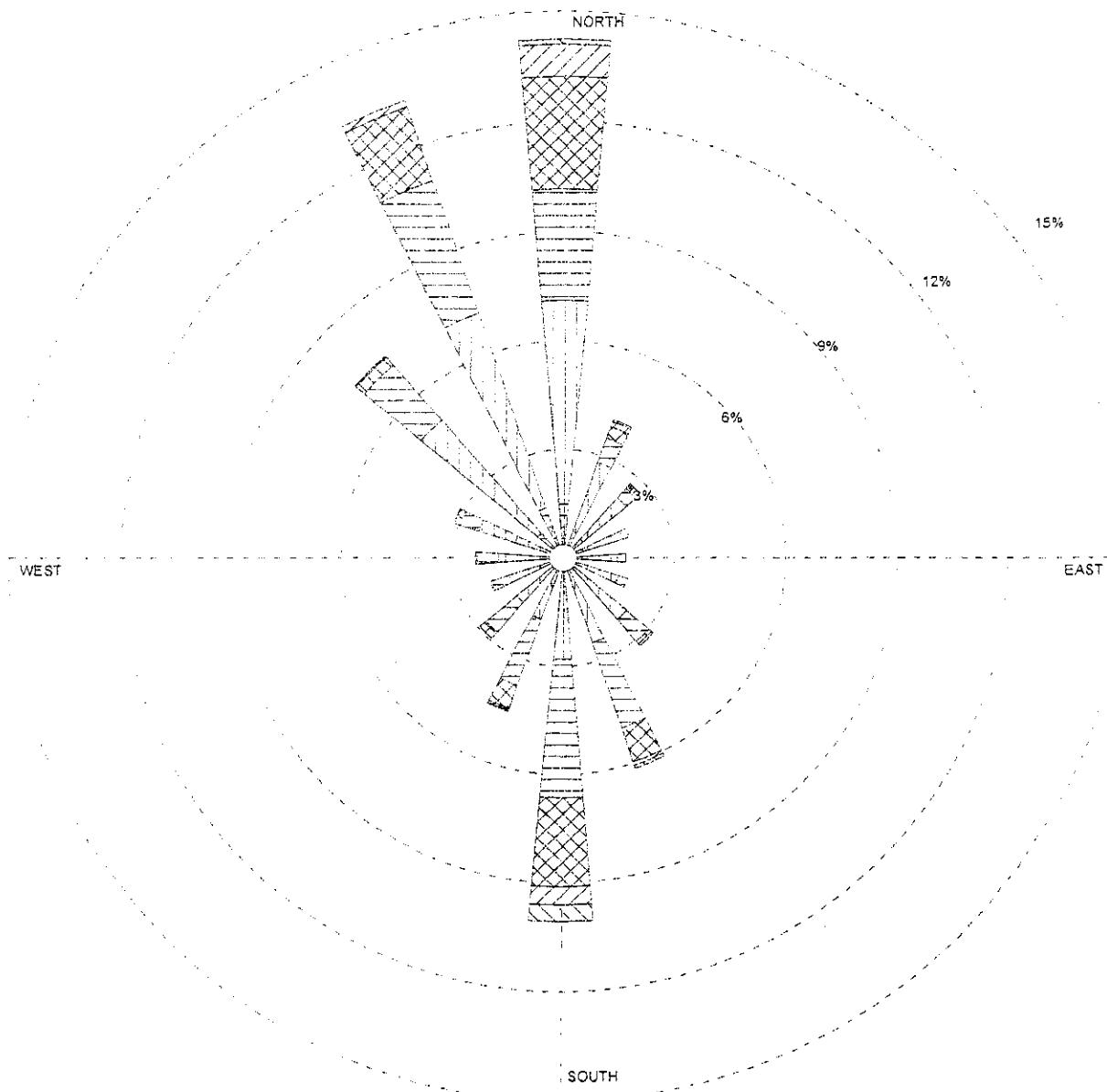
STATION #24257 - REDDING/AAF, CA



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/5/2001	
> 10.8	DISPLAY	COMMENTS
8.8-10.8	Wind Speed	m/s
5.7-8.8	Avg. Wind Speed	CALM WINDS
3.6-5.7	3.71 m/s	18.44%
2.1-3.6		
0.5-2.1	ORIENTATION	PLOT YEAR-DATE-TIME
	Direction (blowing from)	19 January 1 - December 31 Midnight - 11 PM
		PROJECT/PLOT NO. annual1990

WIND ROSE PLOT

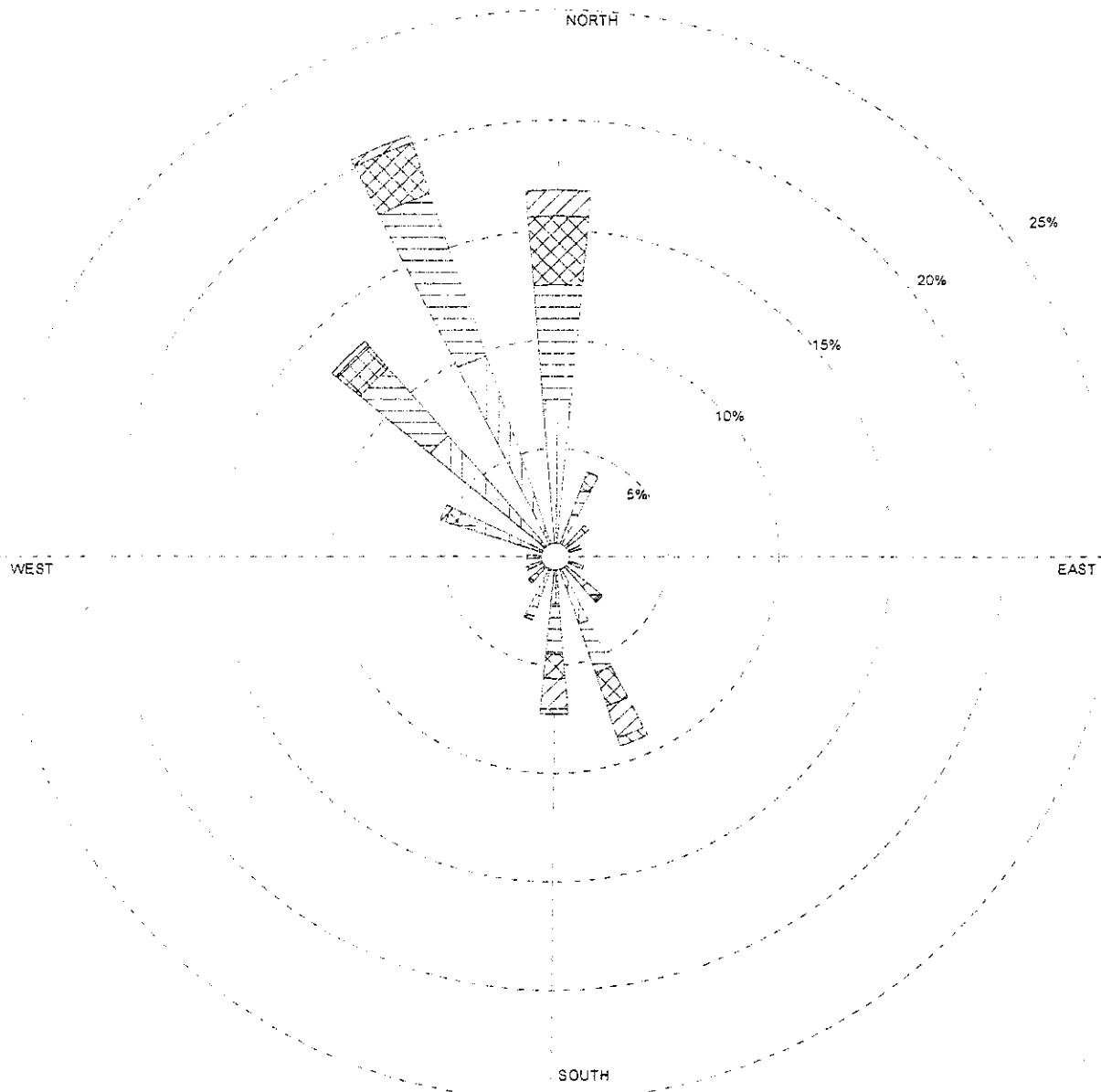
STATION #24257 - REDDING/AAF, CA



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/5/2001	
> 10.8	DISPLAY	UNIT
8.8-10.8	Wind Speed	m/s
5.7-8.8	Avg. Wind Speed	CALM WINDS
3.6-5.7	3.72 m/s	17.83%
2.1-3.6		
0.5-2.1	ORIENTATION	PLOT YEAR-DATE-TIME
	Direction (blowing from)	19 January 1 - December 31 Midnight - 11 PM
		PROJECT/PLOT NO. annual1991

WIND ROSE PLOT

STATION #24216 - RED BLUFF/MUNICIPAL ARPT, CA



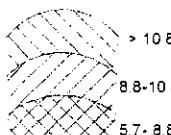
MODELER

DATE

COMPANY NAME

Wind Speed (m/s)

4/10/2001



0.6-2.1

ORIENTATION

PLOT YEAR-DATE-TIME

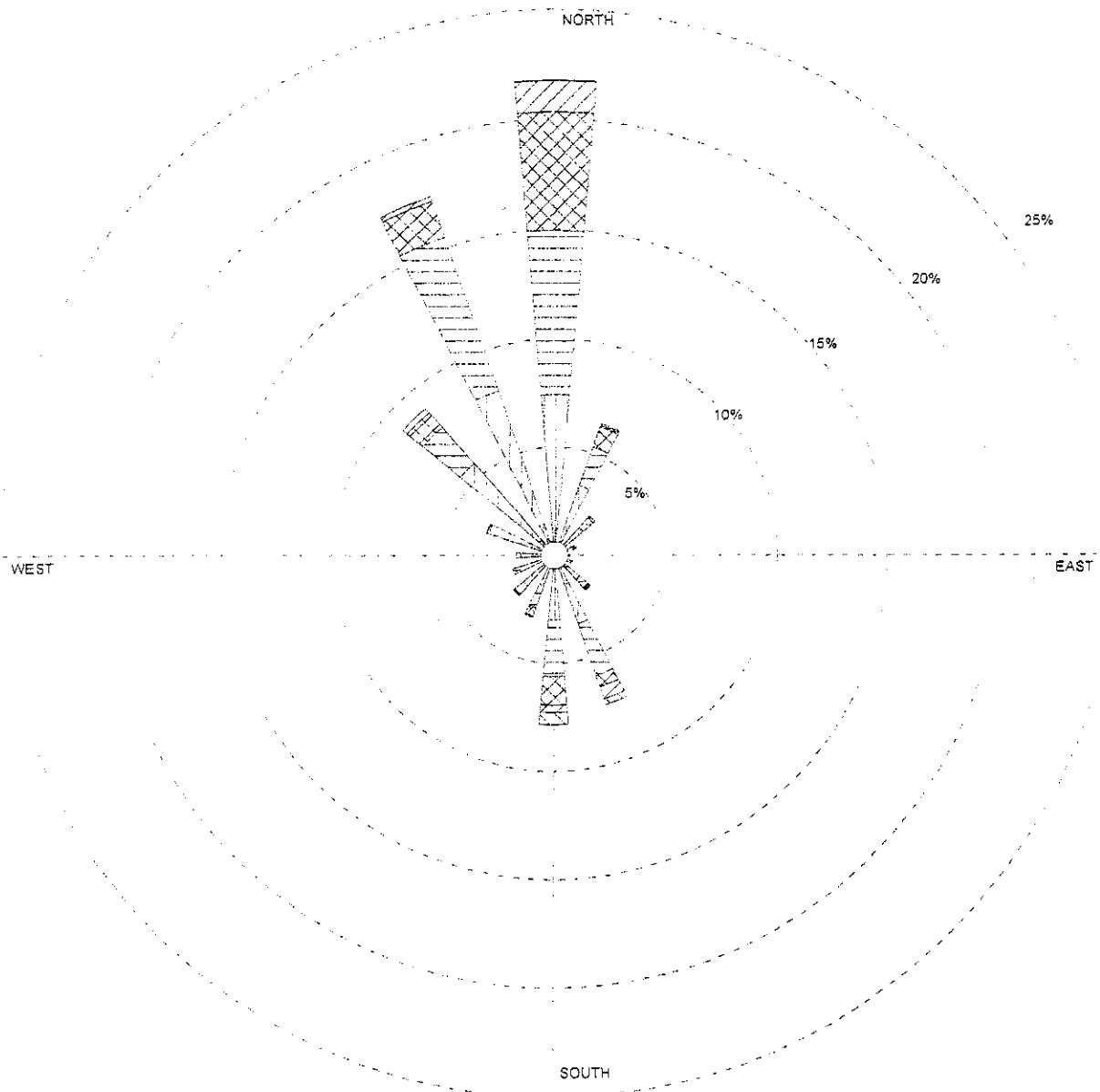
PROJECT/PLOT NO

Direction
(blowing from)19
January 1 - March 31
Midnight - 11 PM

1q1984

WIND ROSE PLOT

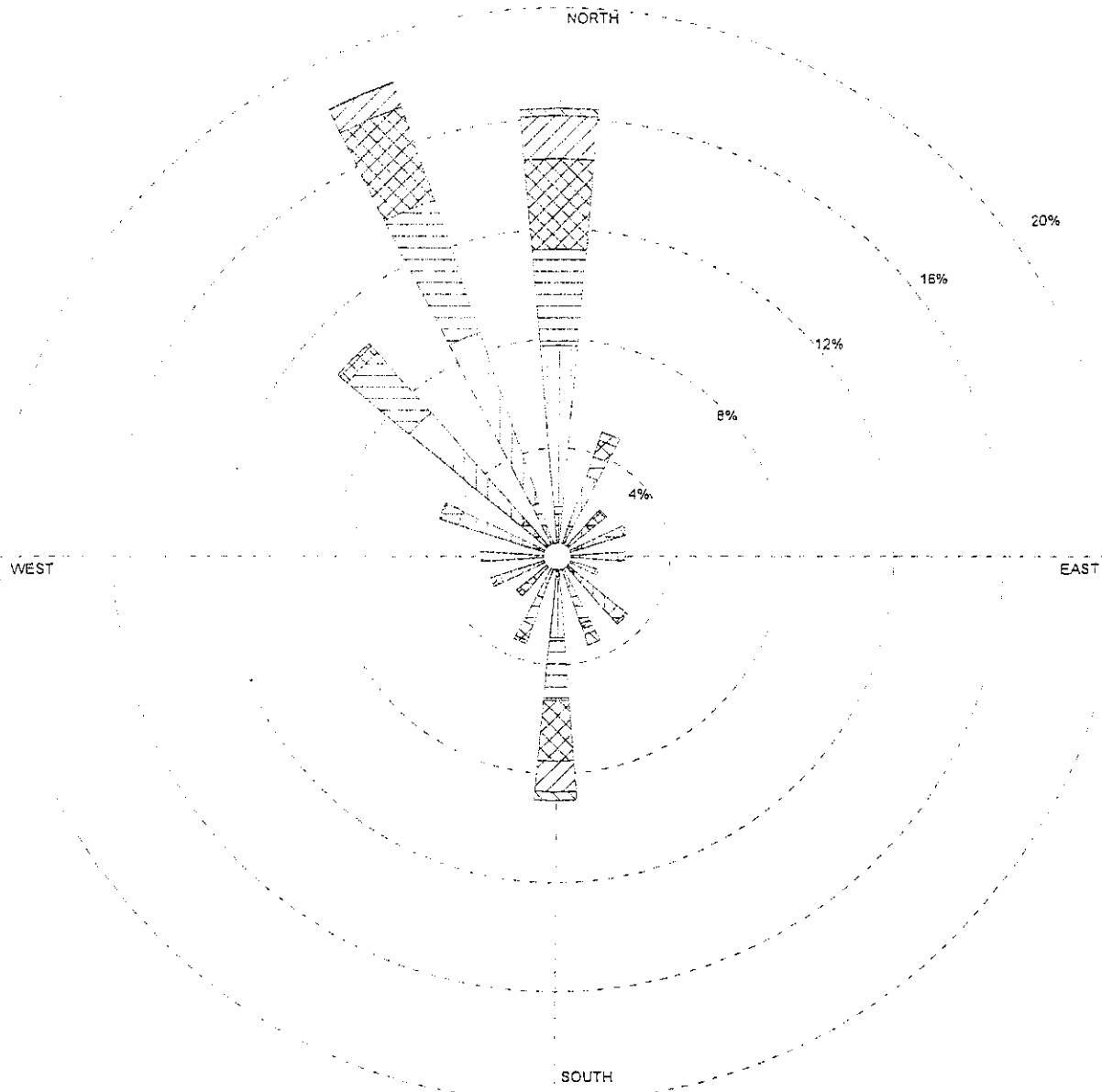
STATION #24216 - RED BLUFF/MUNICIPAL ARPT, CA



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/10/2001	
> 10.8	DISPLAY	UNIT
8.8-10.8	Wind Speed	m/s
5.7- 8.8	Avg. Wind Speed	CALM WINDS
3.6- 5.7	3.89 m/s	9.40%
2.1- 3.6		
0.5- 2.1	ORIENTATION Direction (blowing from)	PLOT YEAR-DATE-TIME 19 January 1 - March 31 Midnight - 11 PM
		PROJECT/PLOT NO. 1q1985

WIND ROSE PLOT

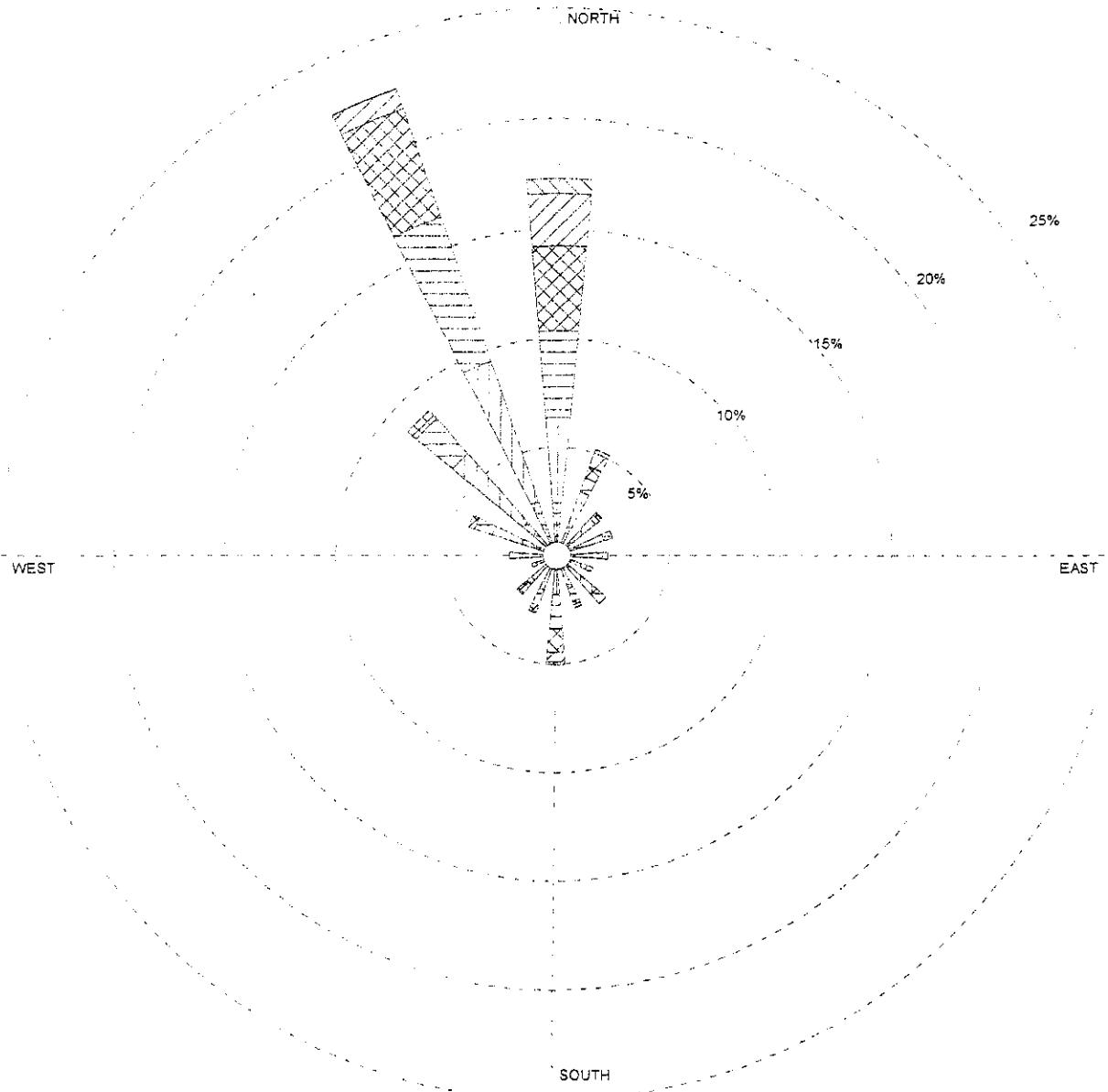
STATION #24257 - REDDING/AAF, CA



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/5/2001	
> 10.8		
8.8-10.8		
5.7- 8.8		
3.6- 5.7		
2.1- 3.6		
0.5- 2.1		
DISPLAY	UNIT	COMMENTS
Wind Speed	m/s	
Avg Wind Speed	CALM WINDS	
3.82 m/s	9.72%	
ORIENTATION	PLOT YEAR-DATE-TIME	PROJECT/PLOT NO.
Direction (blowing from)	19 January 1 - March 31 Midnight - 11 PM	1q1987

WIND ROSE PLOT

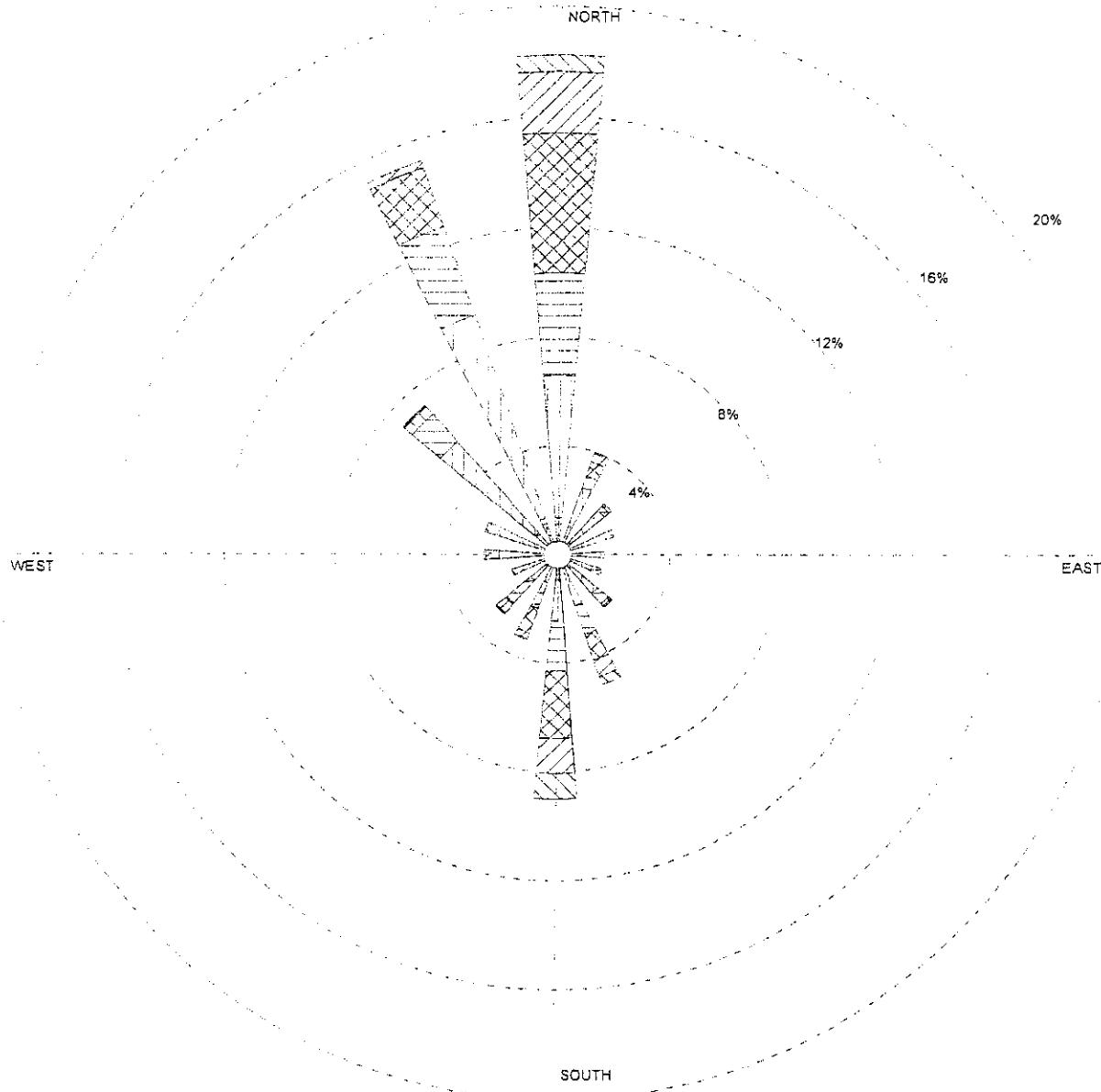
STATION #24257 - REDDING/AAF, CA



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/5/2001	
DISPLAY	UNIT	COMMENTS
> 10.8		
8.8-10.8	Wind Speed	m/s
5.7-8.8	AVG WIND SPEED	CALM WINDS
3.6-5.7	3.92 m/s	12.32%
2.1-3.6		
0.5-2.1	ORIENTATION	PLOT YEAR-DATE-TIME
	Direction	PROJECT/PLOT NO.
	(blowing from)	1q1988

WIND ROSE PLOT

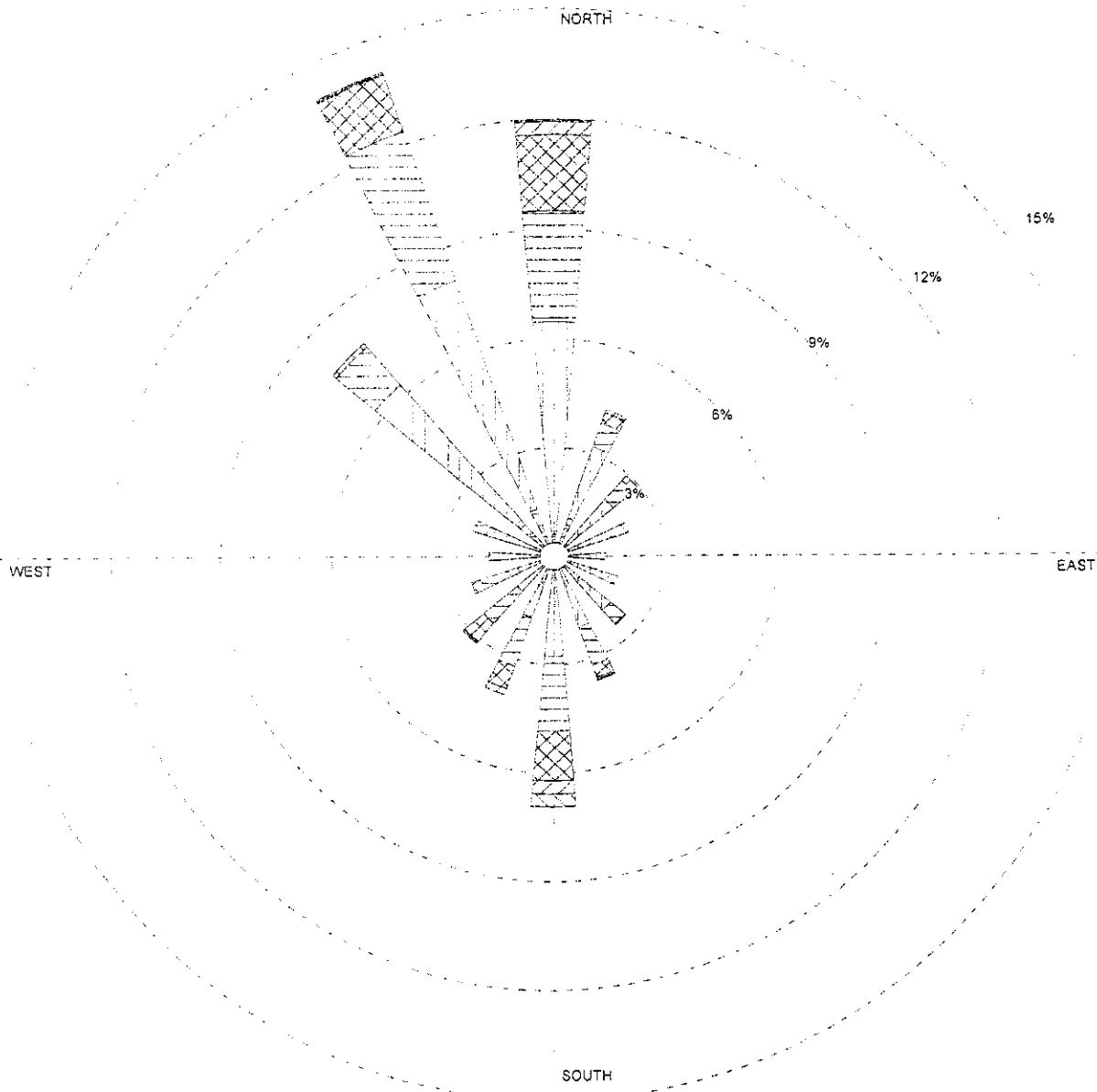
STATION #24257 - REDDING/AAF, CA



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/5/2001	
> 10.8	DISPLAY	UNIT
8.8-10.8	Wind Speed	m/s
5.7- 8.8	Avg. Wind Speed	CALM WINDS
3.6- 5.7	4.17 m/s	16.62%
2.1- 3.6		
0.5- 2.1	ORIENTATION Direction (blowing from)	PLOT YEAR-DATE-TIME 19 January 1 - March 31 Midnight - 11 PM
		PROJECT/PLOT NO. 1q1989

WIND ROSE PLOT

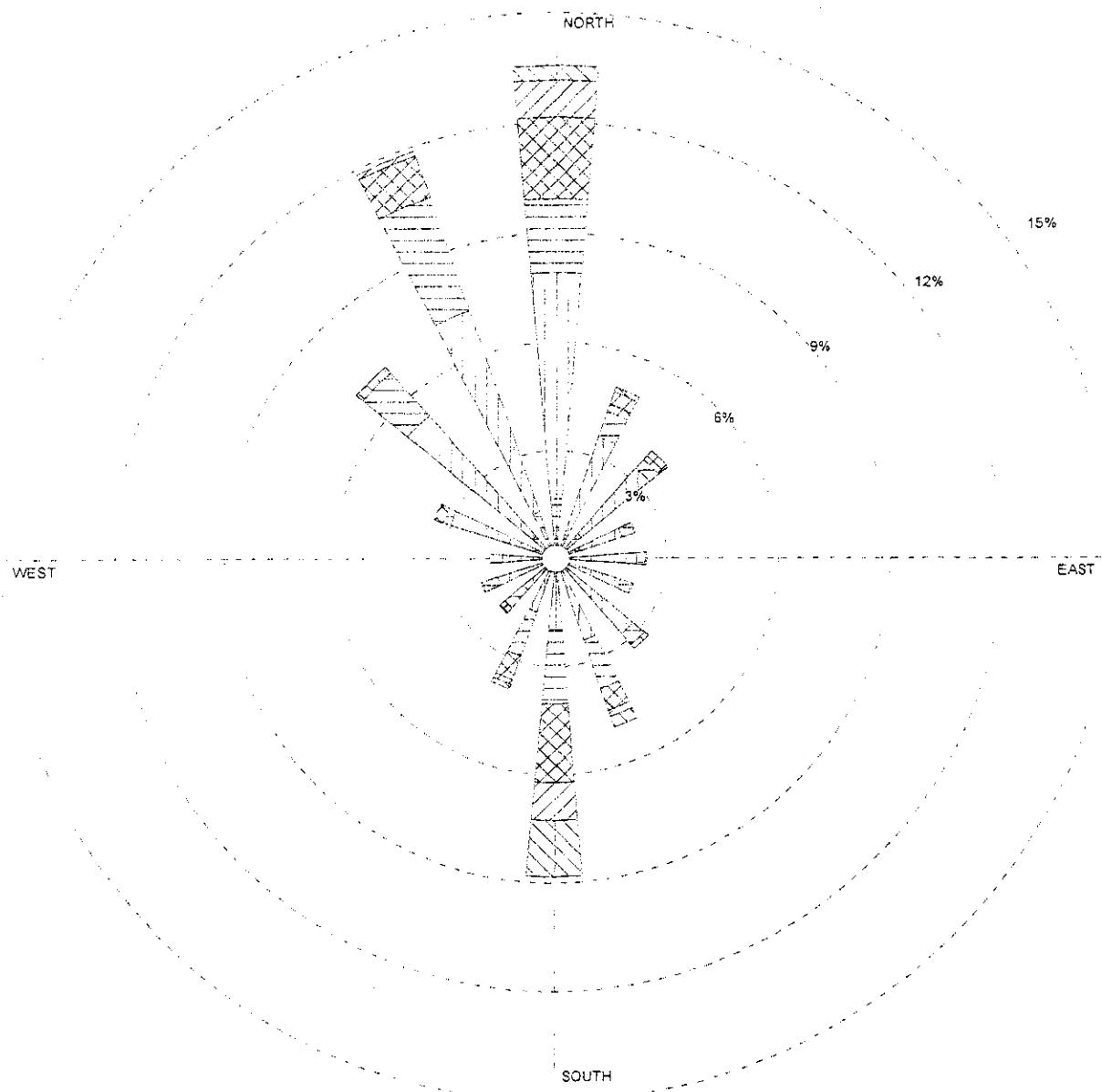
STATION #24257 - REDDING/AAF, CA



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/5/2001	
> 10.8	DISPLAY	COMMENTS
8.8-10.8	Wind Speed	m/s
5.7-8.8	Avg. Wind Speed	CALM WINDS
3.6-5.7	3.47 m/s	26.53%
2.1-3.6		
0.5-2.1	ORIENTATION Direction (blowing from)	PLOT YEAR-DATE-TIME 19 January 1 - March 31 Midnight - 11 PM
		PROJECT/PLOT NO 1q1990

WND ROSE PLOT

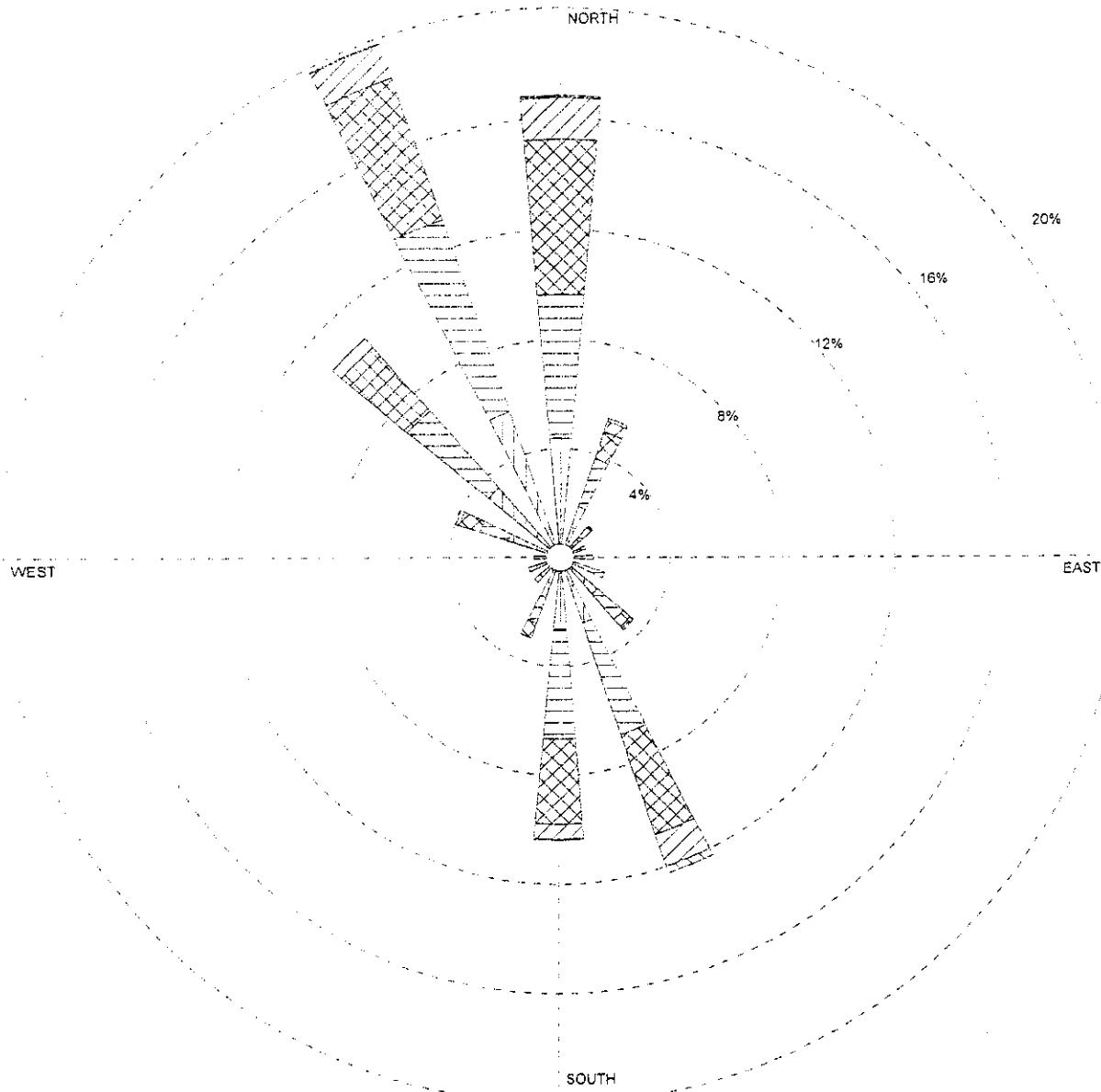
STATION #24257 - REDDING/AAF, CA



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/5/2001	
> 10.8	DISPLAY	COMMENTS
8.8-10.8	Wind Speed	m/s
5.7-8.8	Avg. Wind Speed	CALM WINDS
3.6-5.7	3.83 m/s	20.69%
2.1-3.6	ORIENTATION	PLOT YEAR-DATE-TIME
0.5-2.1	Direction (blowing from)	19 January 1 - March 31 Midnight - 11 PM
		PROJECT/PLOT NO. 1q1991

WIND ROSE PLOT

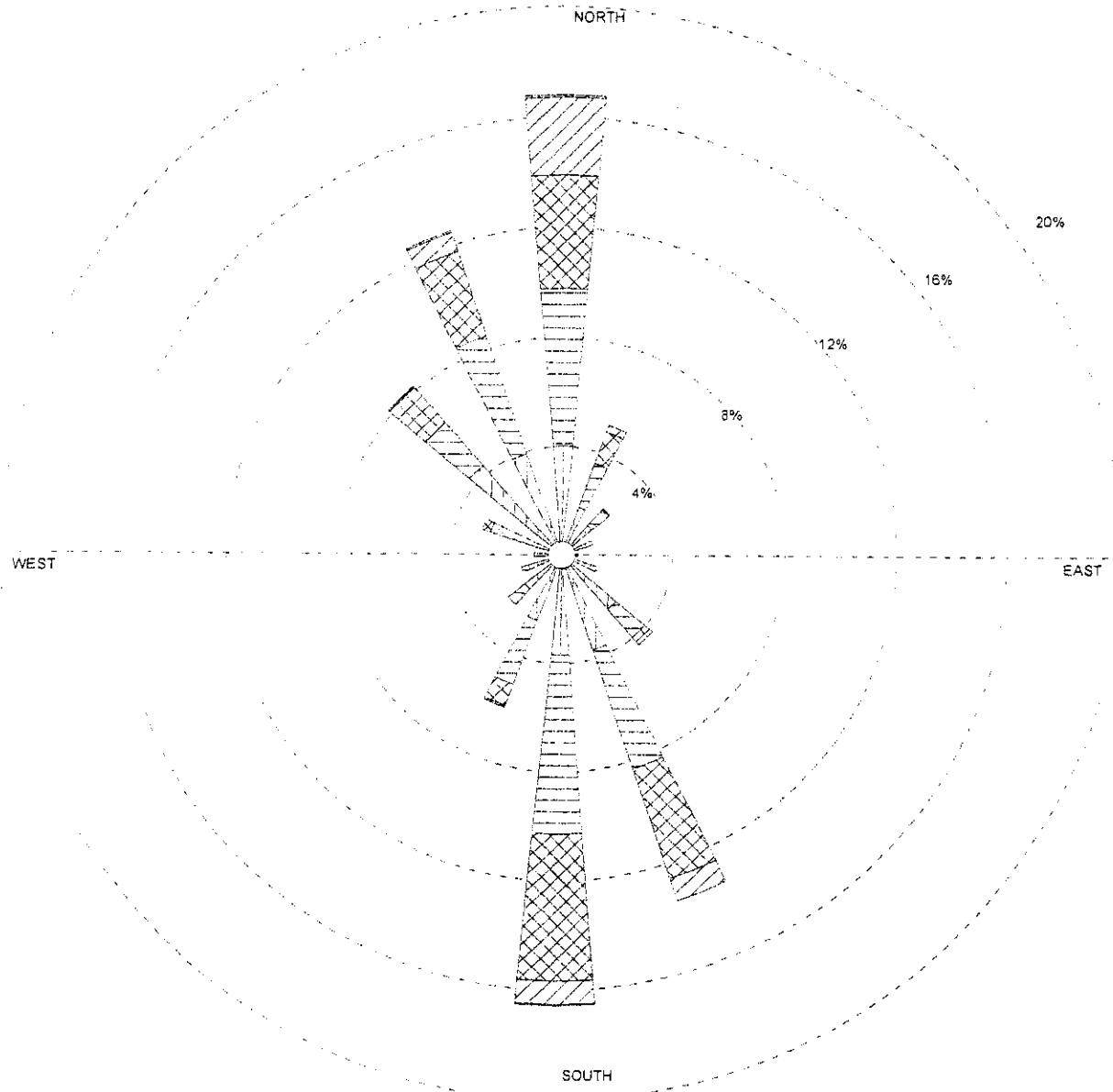
STATION #24216 - RED BLUFF/MUNICIPAL ARPT, CA



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/10/2001	
> 10.8	DISPLAY	
8.8-10.8	Wind Speed	UNIT
		m/s
5.7- 8.8	AVG. WIND SPEED	COMMENTS
3.6- 5.7	4.75 m/s	CALM WINDS
2.1- 3.6		4.35%
0.5- 2.1	ORIENTATION	PLOT YEAR-DATE-TIME
	Direction	PROJECT/PLOT NO
	(blowing from)	19
		April 1 - June 30
		Midnight - 11 PM
		2q1984

WIND ROSE PLOT

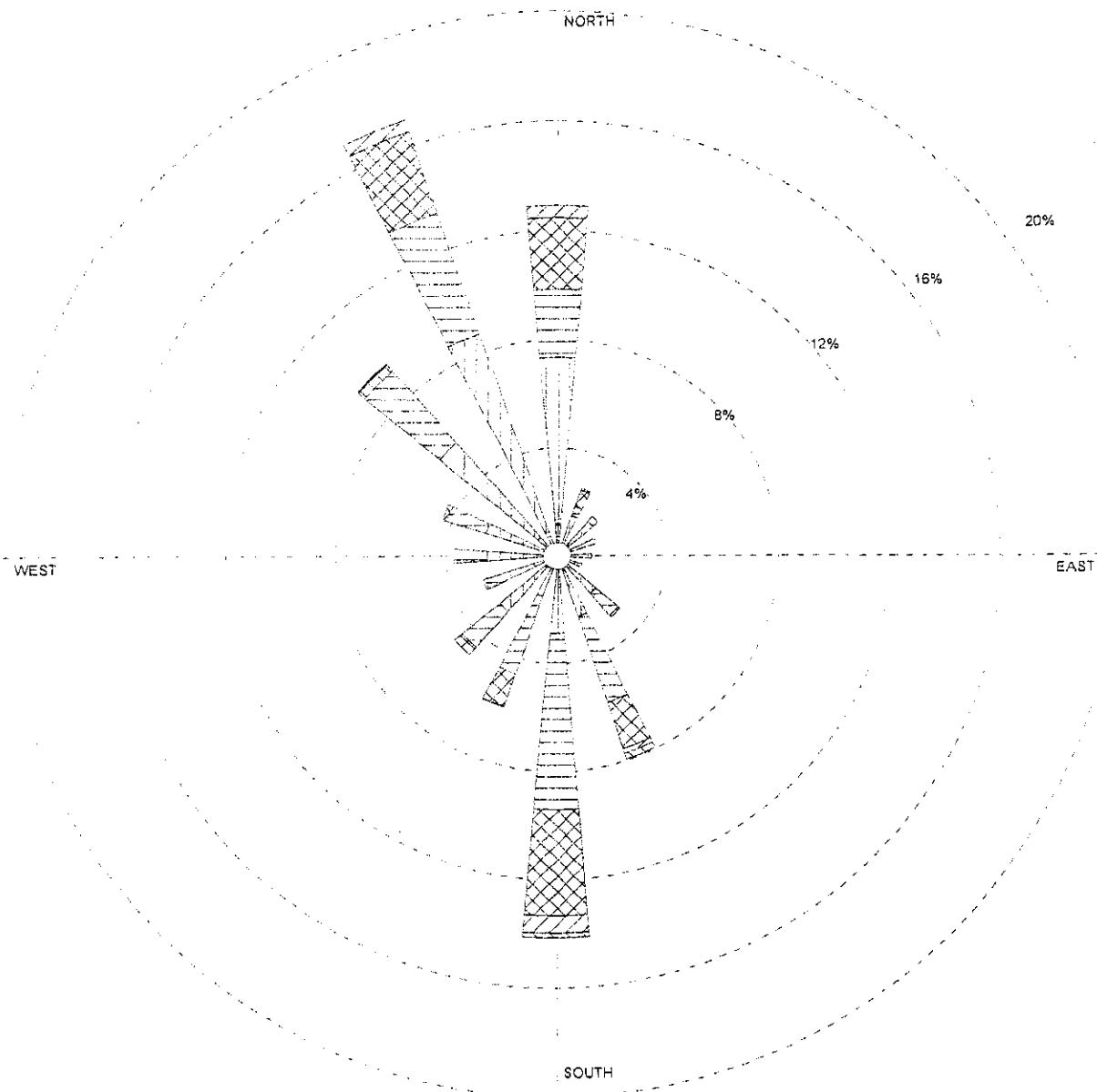
STATION #24216 - RED BLUFF/MUNICIPAL ARPT, CA



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/10/2001	
> 10.8	DISPLAY	COMMENTS
8.8-10.8	Wind Speed	m/s
5.7- 8.8	AVG. WIND SPEED	CALM WINDS
3.6- 5.7	4.50 m/s	3.07%
2.1- 3.6		
0.5- 2.1	ORIENTATION Direction (blowing from)	PLOT/YEAR-DATE-TIME PROJECT/PLOT NO.
		19 April 1 - June 30 Midnight - 11 PM
		2q1985

WIND ROSE PLOT

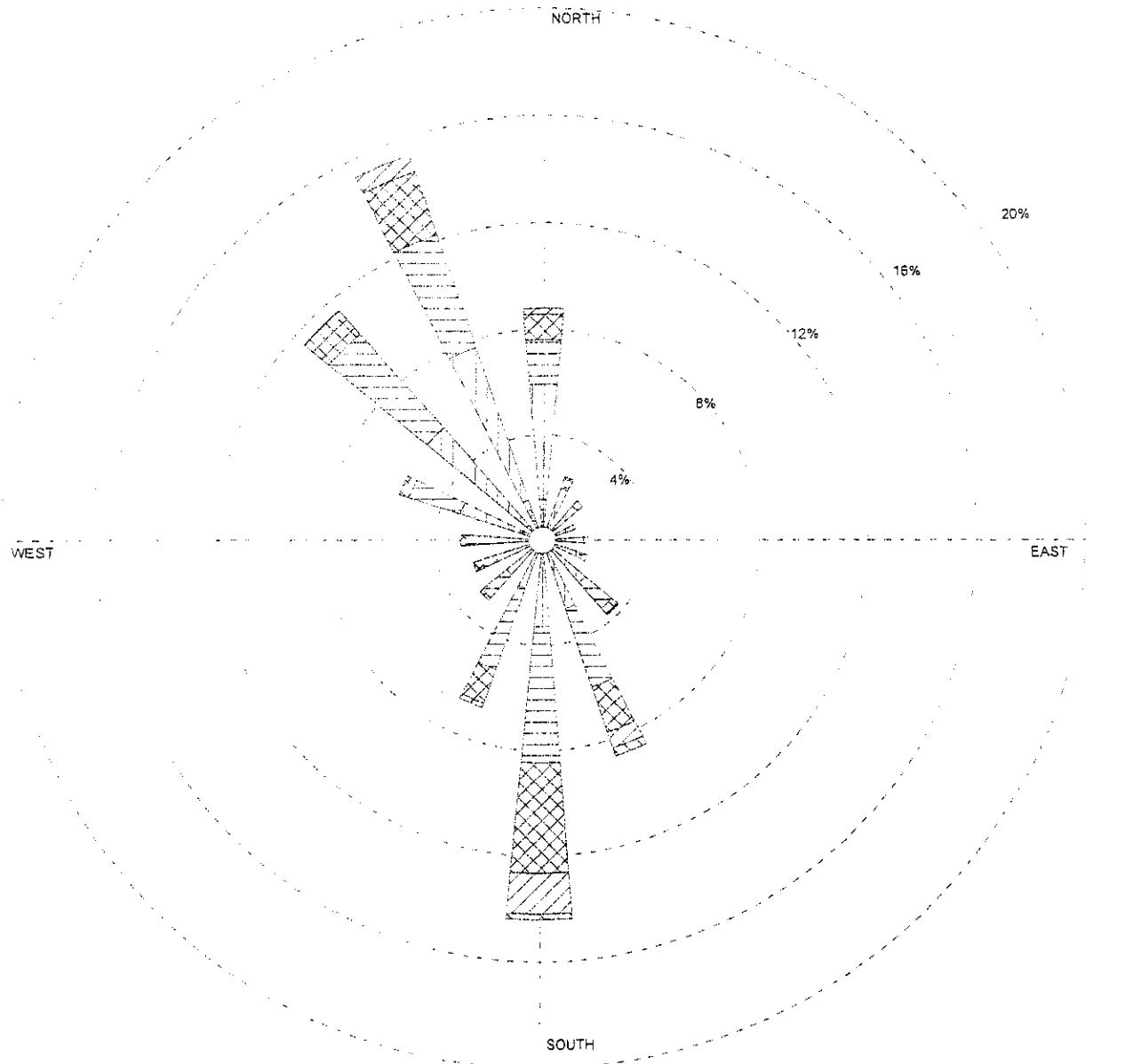
STATION #24257 - REDDING/AAF, CA



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/5/2001	
> 10.8	DISPLAY	COMMENTS
8.8-10.8	Wind Speed	m/s
5.7-8.8	Avg Wind Speed	CALM WINDS
3.6-5.7	3.86 m/s	4.90%
2.1-3.6		
0.5-2.1	ORIENTATION Direction (blowing from)	PLOT YEAR-DATE-TIME PROJECT/PLOT NO.
		19 April 1 - June 30 Midnight - 11 PM
		2q1987

WIND ROSE PLOT

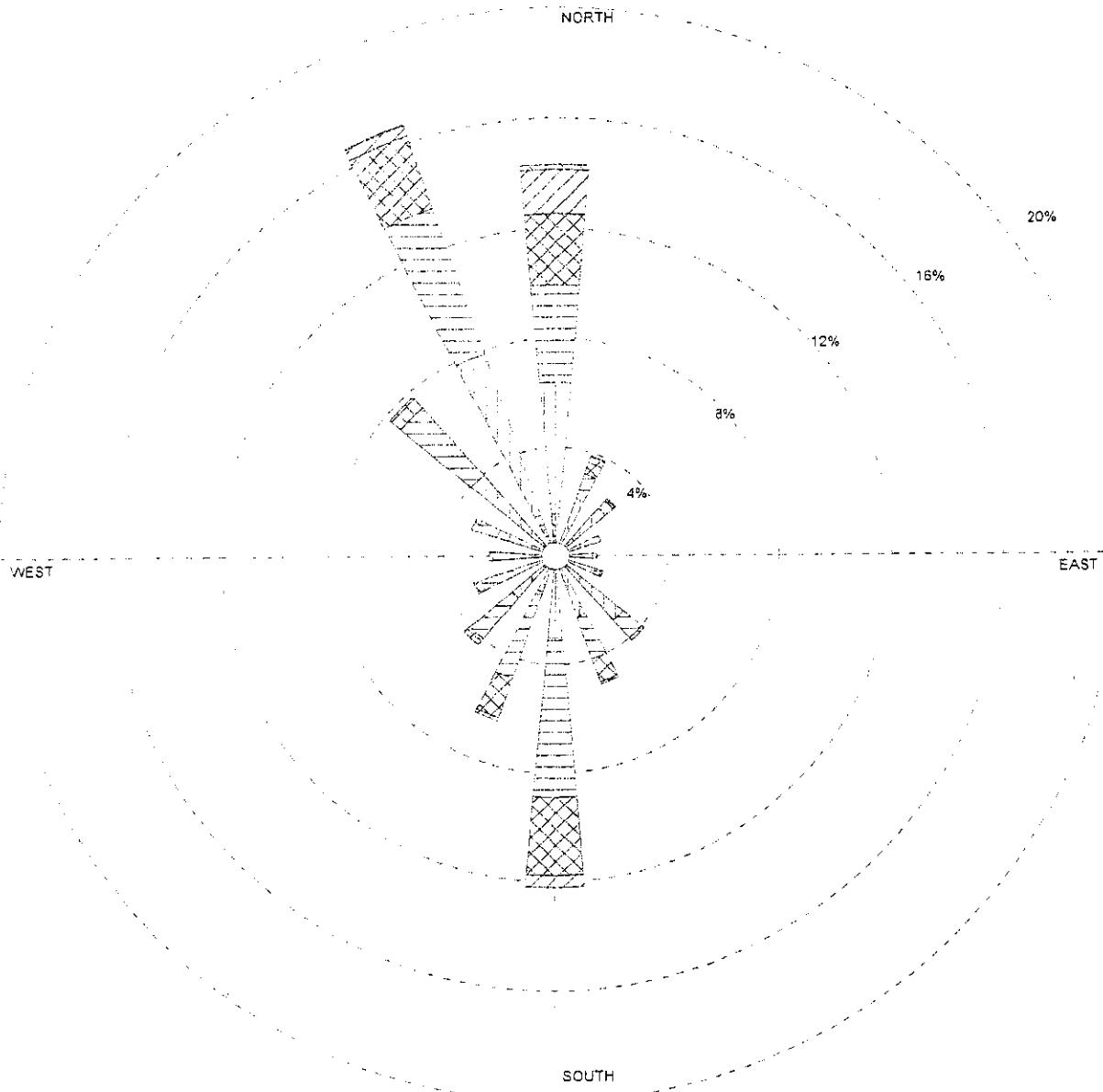
STATION #24257 - REDDING/AAF, CA



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/5/2001	
> 10.8	DISPLAY	COMMENTS
8.6-10.8	Wind Speed	m/s
5.7-8.8	AVG WIND SPEED	CALM WINDS
3.6-5.7	3.94 m/s	6.23%
2.1-3.6		
0.6-2.1	ORIENTATION	PLOT YEAR-DATE-TIME
	Direction (blowing from)	19 April 1 - June 30 Midnight - 11 PM
		PROJECT/PLOT NO. 2q1988

WIND ROSE PLOT

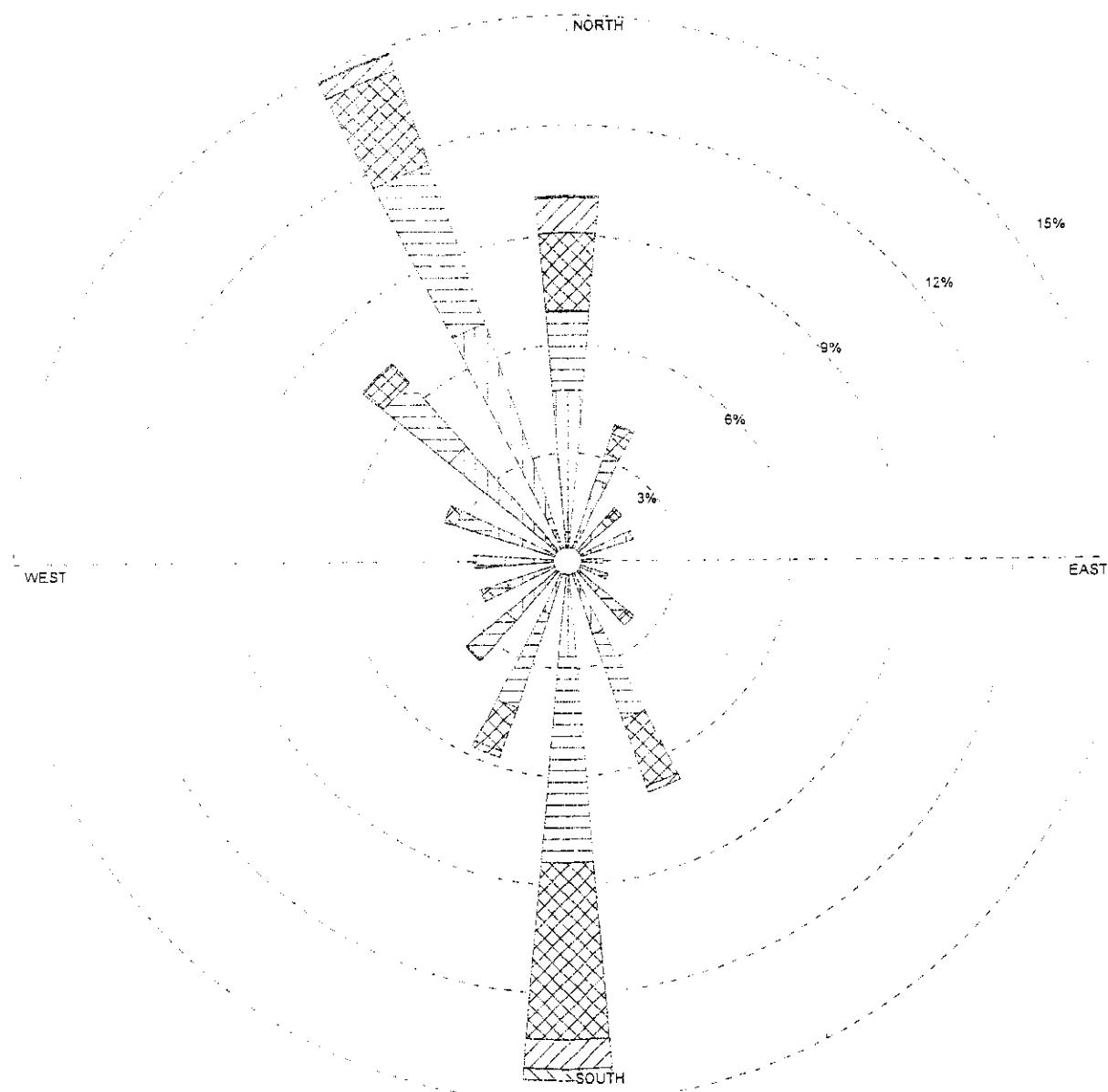
STATION #24257 - REDDING/AAF, CA



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/5/2001	
> 10.8	DISPLAY	COMMENTS
8.8-10.8	Wind Speed	m/s
5.7-8.8	Avg. Wind Speed	CALM WINDS
3.6-5.7	3.89 m/s	8.06%
2.1-3.6		
0.5-2.1	ORIENTATION Direction (blowing from)	PLOT YEAR-DATE-TIME PROJECT/PLOT NO.
		19 April 1 - June 30 Midnight - 11 PM
		2q1989

WIND ROSE PLOT

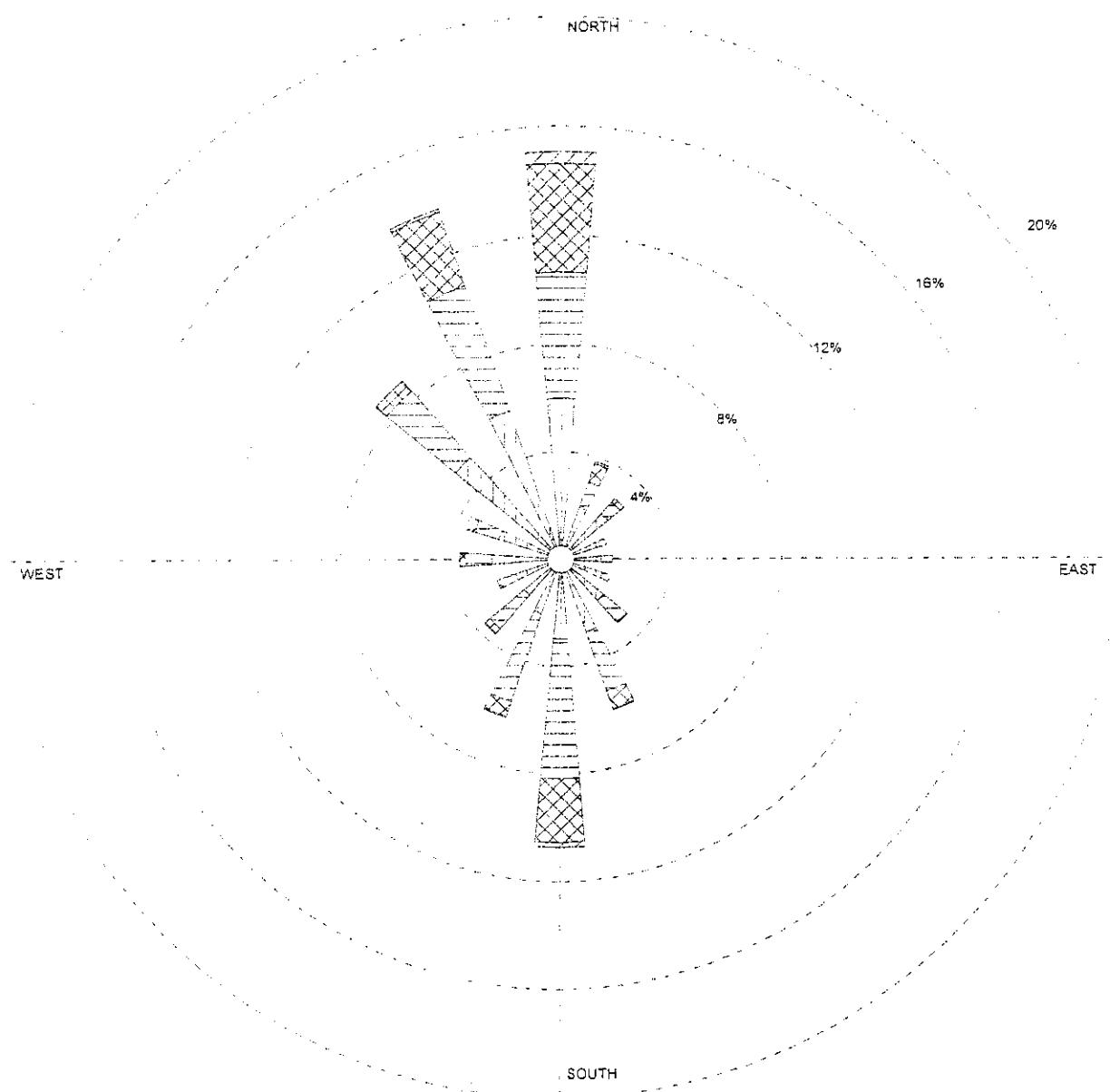
STATION #24257 - REDDING/AAF, CA



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/5/2001	
> 10.8	DISPLAY	COMMENTS
8.8-10.8	Wind Speed	m/s
5.7-8.8	Avg. Wind Speed	CALM WINDS
3.6-5.7	4.15 m/s	15.80%
2.1-3.6	ORIENTATION	PROJECT/PLOT NO
0.5-2.1	Direction (blowing from)	19 April 1 - June 30 Midnight - 11 PM
		2q1990

WIND ROSE PLOT

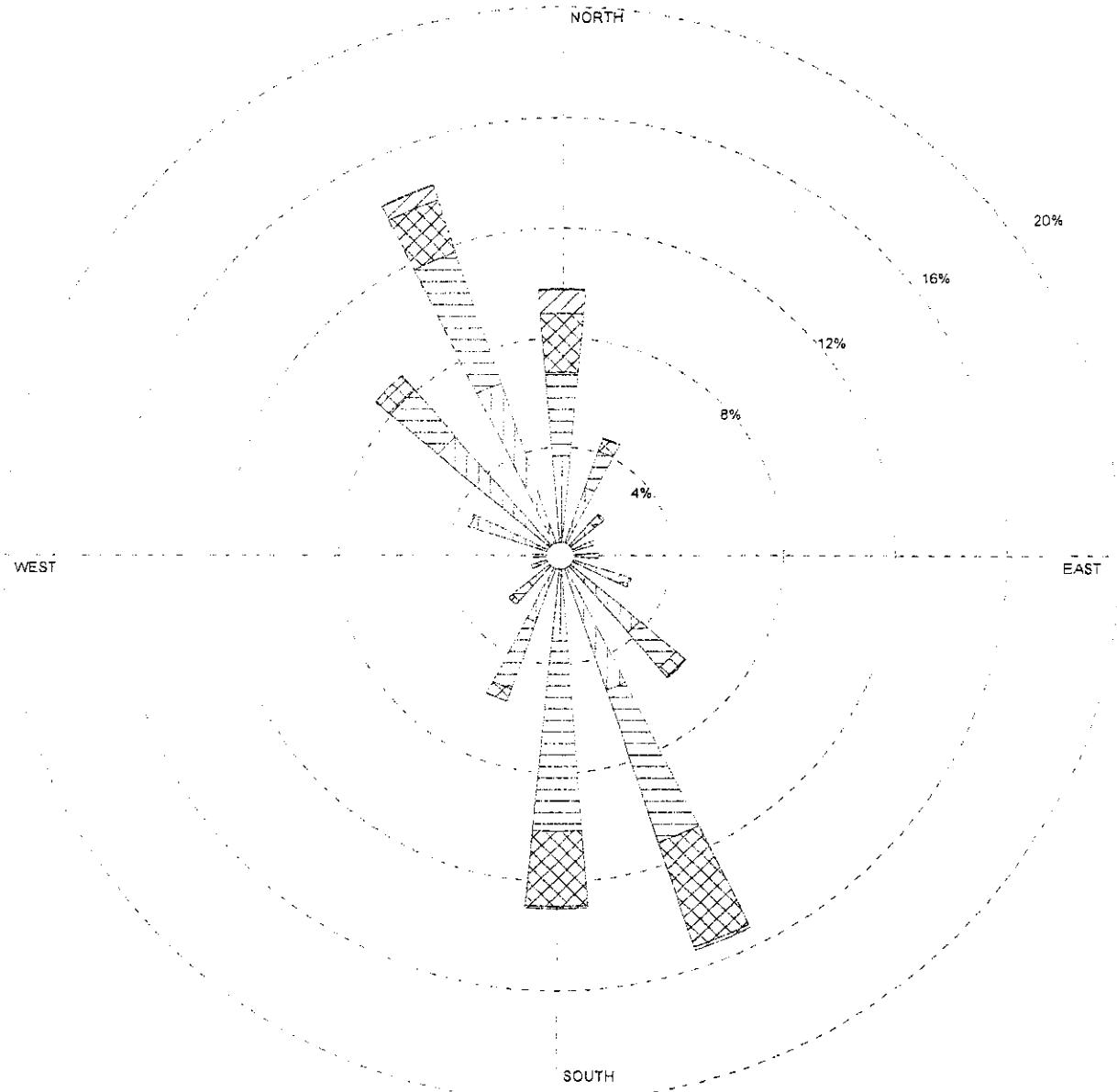
STATION #24257 - REDDING/AAF, CA



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/5/2001	
> 10.8	DISPLAY	COMMENTS
8.8-10.8	Wind Speed	m/s
5.7-8.8	Avg Wind Speed	CALM WINDS
3.6-5.7	3.75 m/s	9.89%
2.1-3.6		
0.5-2.1	ORIENTATION	PLOT YEAR-DATE-TIME
	Direction (blowing from)	19 April 1 - June 30 Midnight - 11 PM
		PROJECT/PLOT NO.
		2q1991

WIND ROSE PLOT

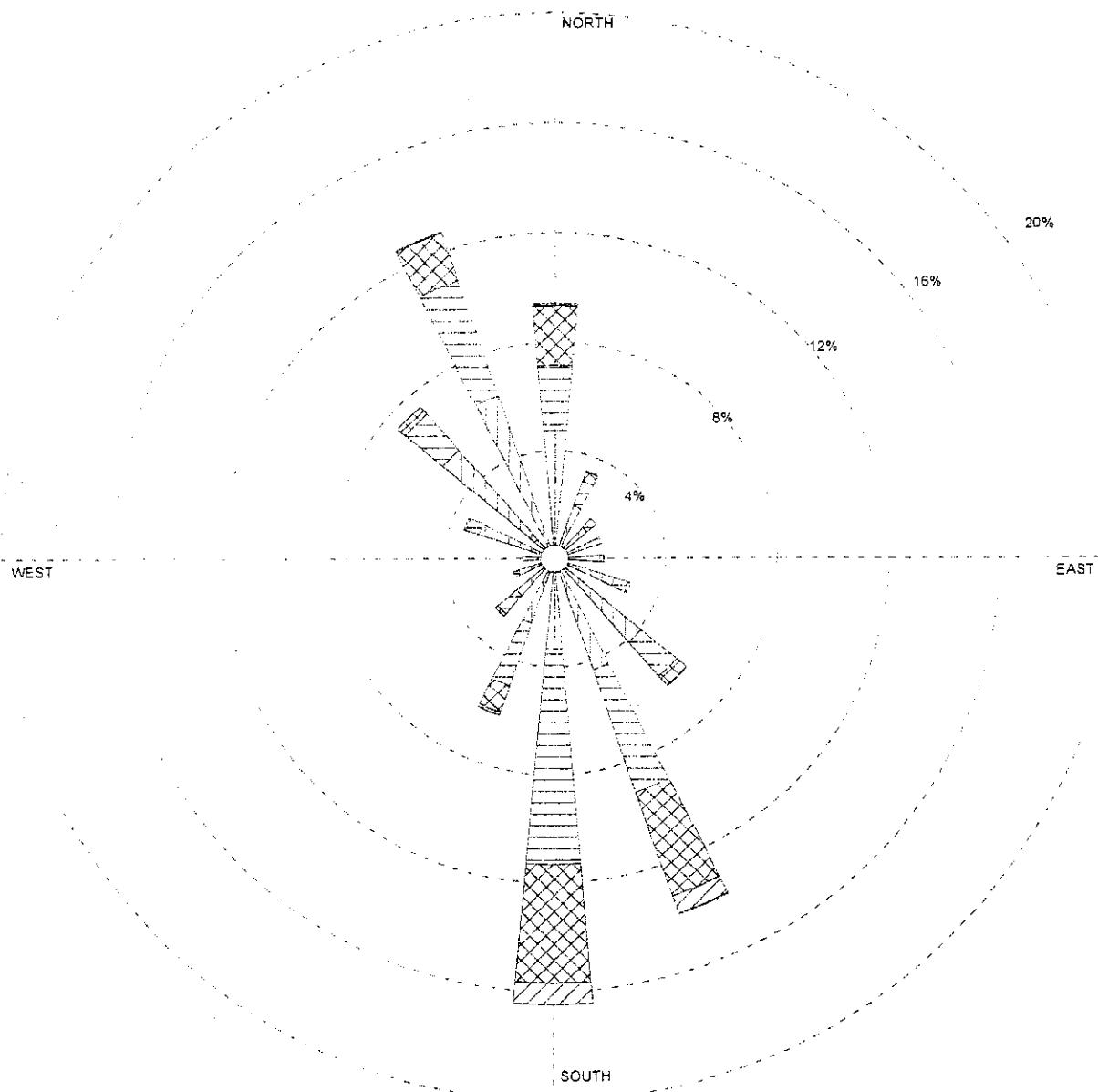
STATION #24216 - RED BLUFF/MUNICIPAL ARPT, CA



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/10/2001	
> 10.8	DISPLAY	COMMENTS
8.8-10.8	Wind Speed	m/s
5.7-6.8	Avg Wind Speed	CALM WINDS
3.6-5.7	3.82 m/s	6.66%
2.1-3.6		
0.5-2.1	ORIENTATION Direction (blowing from)	PLOT YEAR-DATE-TIME PROJECT/PLOT NO.
		19 July 1 - September 30 Midnight - 11 PM
		3q1984

WIND ROSE PLOT

STATION #24216 - RED BLUFF/MUNICIPAL ARPT, CA



MODELER

DATE

COMPANY NAME

Wind Speed (m/s)

4/10/2001

> 10.8

DISPLAY

UNIT

COMMENTS

8.8-10.8

Wind Speed

m/s

5.7- 8.8

AVG WIND SPEED

CALM WINDS

3.6- 5.7

3.84 m/s

6.16%

2.1- 3.6

ORIENTATION

PLOT YEAR-DATE-TIME

PROJECT/PLOT NO.

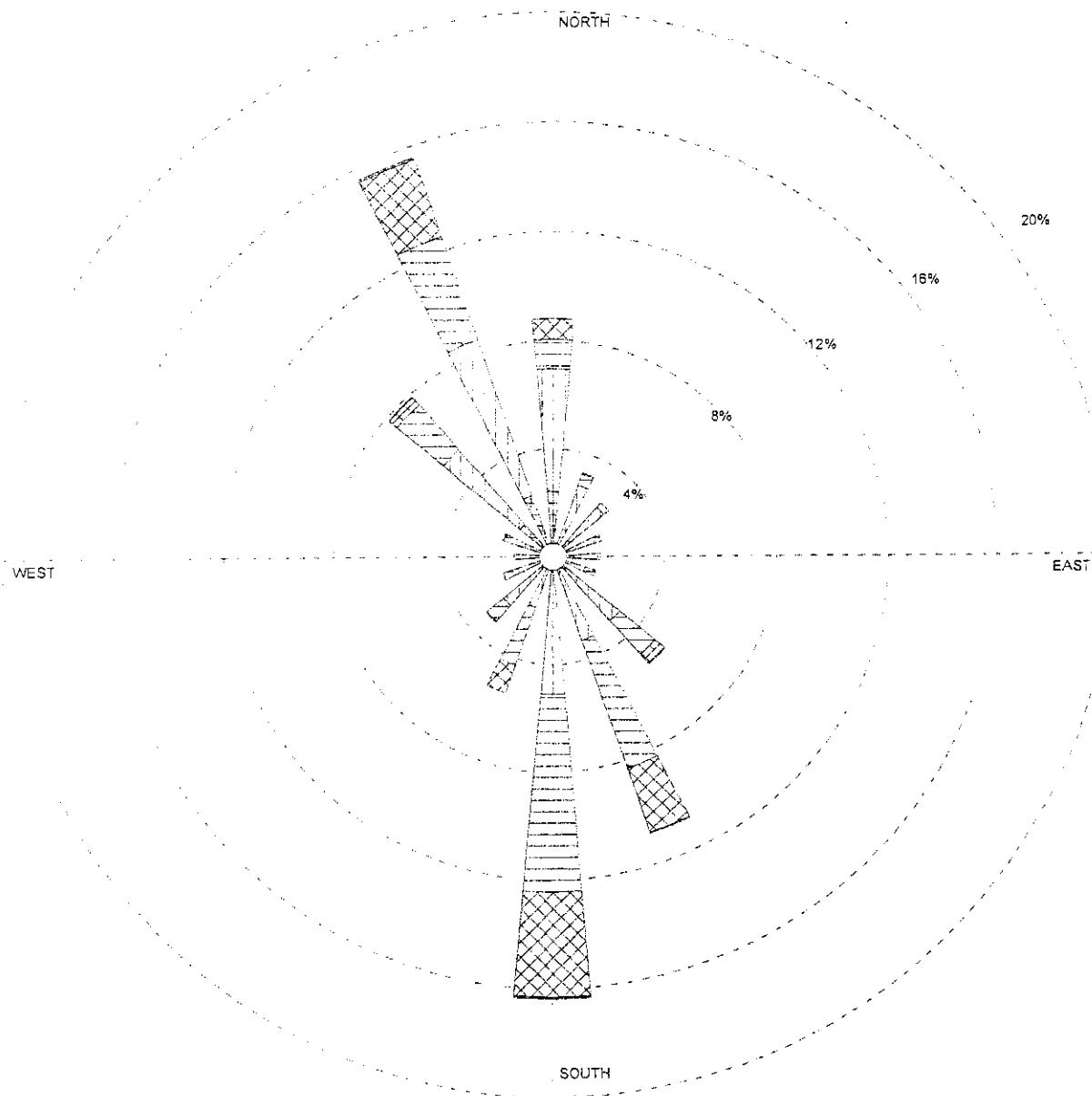
0.5- 2.1

Direction
(blowing from)19
July 1 - September 30
Midnight - 11 PM

3q1985

WND ROSE PLOT

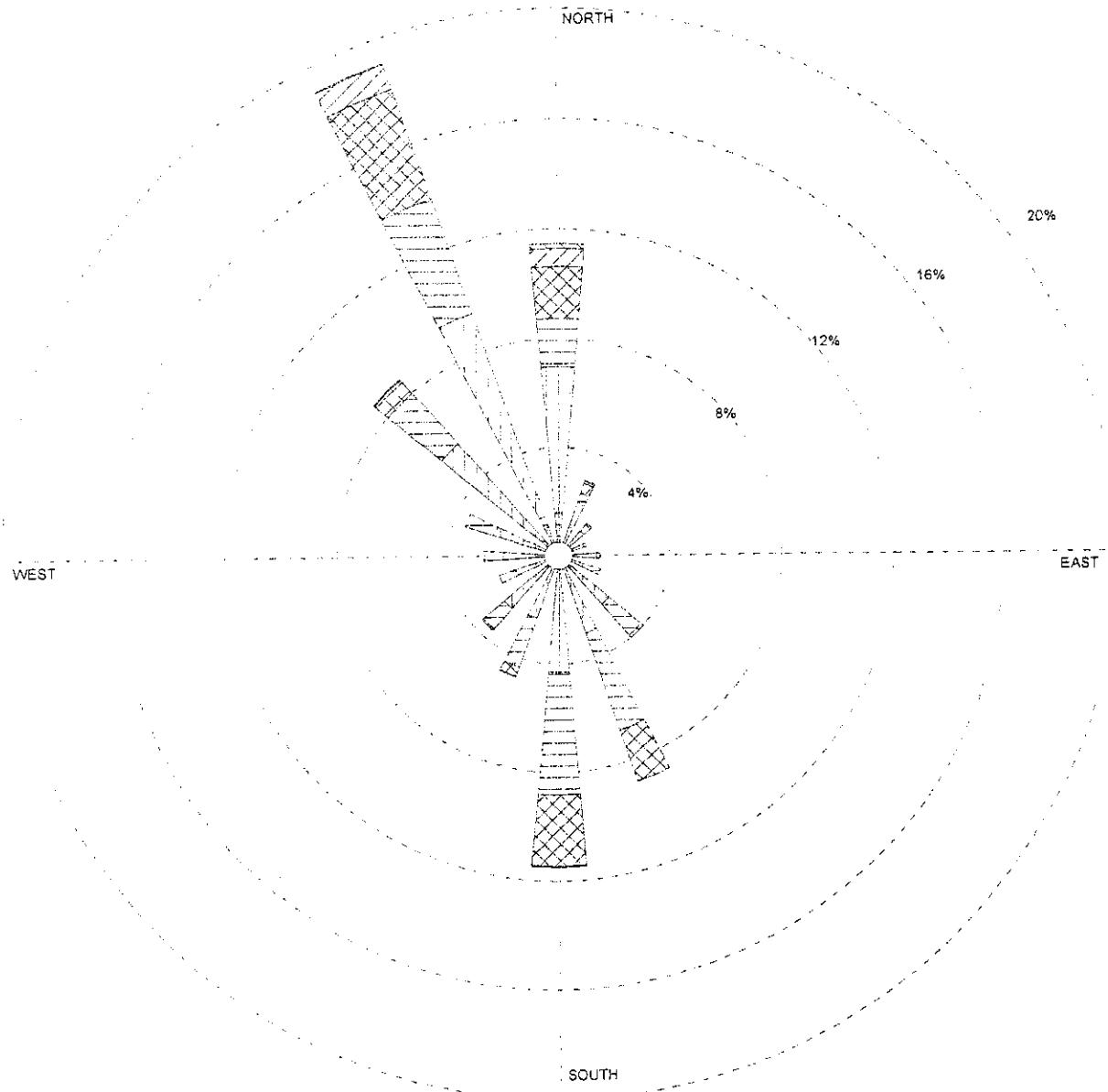
STATION #24257 - REDDING/AAF, CA



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/5/2001	
> 10.8	DISPLAY	COMMENTS
8.8-10.8	Wind Speed	m/s
5.7-8.8	Avg Wind Speed	CALM WINDS
3.6-5.7	3.47 m/s	9.51%
2.1-3.6		
0.5-2.1	ORIENTATION Direction (blowing from)	PLOT YEAR-DATE-TIME 19 July 1 - September 30 Midnight - 11 PM
		PROJECT/PLOT NO. 3q1987

WIND ROSE PLOT

STATION #24257 - REDDING/AAF, CA



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/5/2001	
> 10.8	DISPLAY	
8.8-10.8	Wind Speed	UNIT
5.7-8.8	Avg Wind Speed	m/s
3.6-5.7	3.69 m/s	COMMENTS
2.1-3.6		CALM WINDS
0.5-2.1	ORIENTATION	PLOT YEAR-DATE-TIME
	Direction	19
	(blowing from)	July 1 - September 30
		Midnight - 11 PM
		PROJECT/PLOT NO
		3q1988

WIND ROSE PLOT

STATION #24257 - REDDING/AAF, CA

NORTH

WEST

20%

16%

12%

8%

4%

EAST

SOUTH

MODELER

DATE

COMPANY NAME

Wind Speed (m/s)

4/5/2001

> 10.8 DISPLAY
8.8-10.8 Wind Speed

UNIT

COMMENTS

m/s

5.7-8.8 AVG WIND SPEED
3.6- 5.7 3.39 m/s

CALM WINDS

10.87%

2.1- 3.6
0.5- 2.1 ORIENTATION
Direction
(blowing from)

PLOT YEAR-DATE-TIME

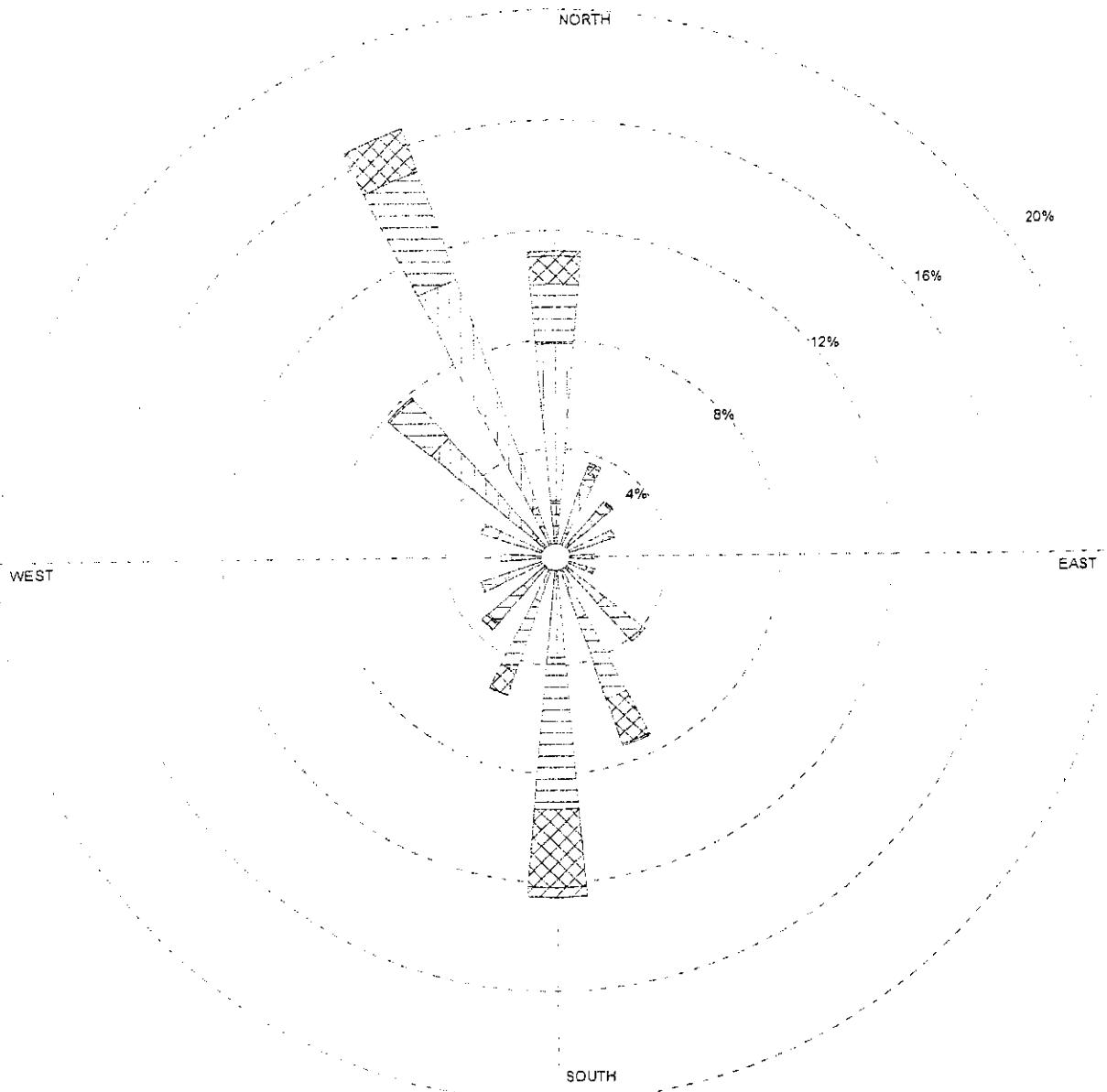
PROJECT/PLOT NO.

19
July 1 - September 30
Midnight - 11 PM

3q1989

WIND ROSE PLOT

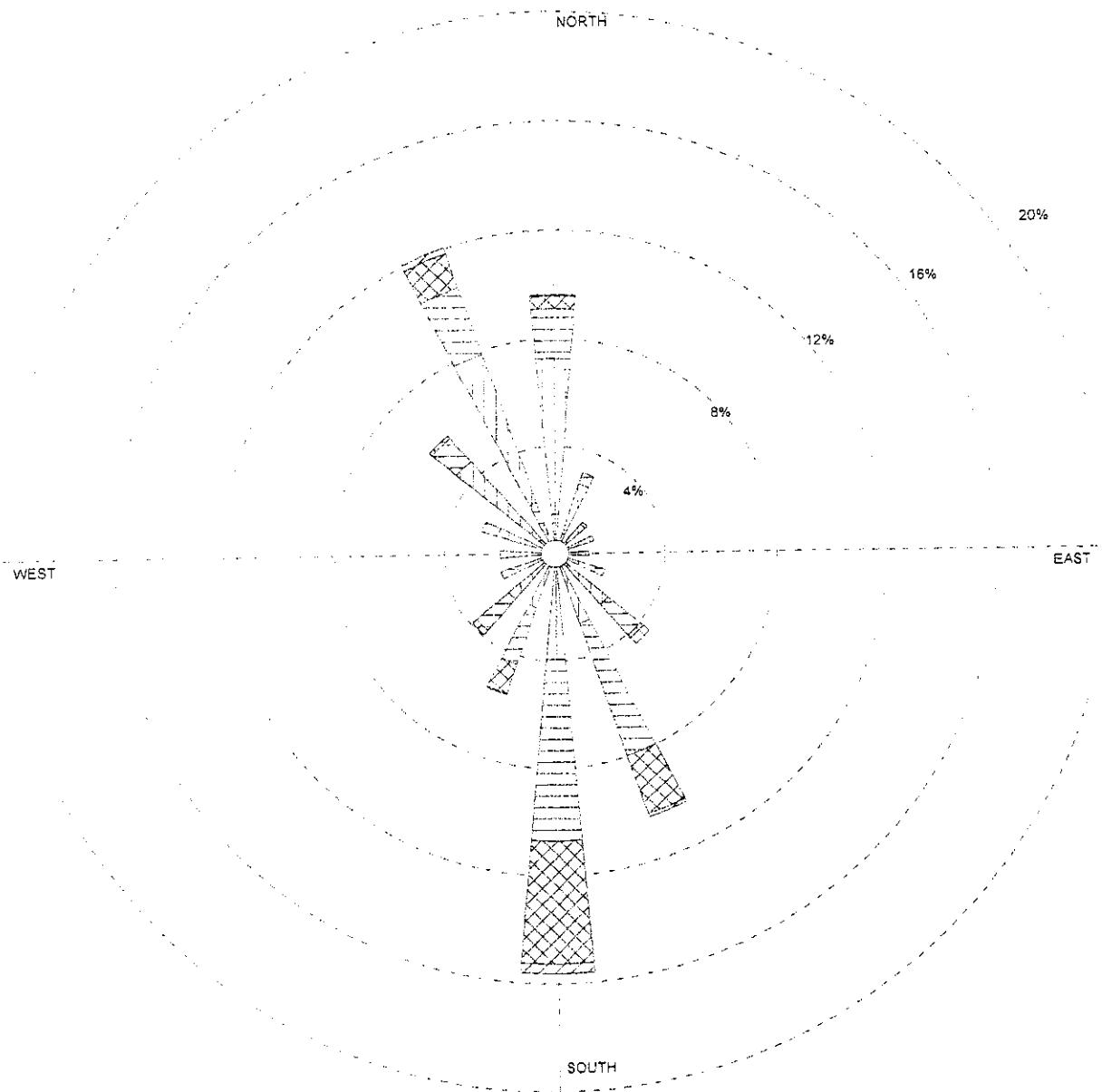
STATION #24257 - REDDING/AAF, CA



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/5/2001	
> 10.8	DISPLAY	COMMENTS
8.8-10.8	Wind Speed	m/s
5.7-8.8	Avg Wind Speed	CALM WINDS
3.6- 5.7	3.43 m/s	11.41%
2.1- 3.6		
0.5- 2.1	ORIENTATION	PLOT YEAR-DATE-TIME
	Direction (blowing from)	19 July 1 - September 30 Midnight - 11 PM
		PROJECT/PLOT NO. 3q1990

WIND ROSE PLOT

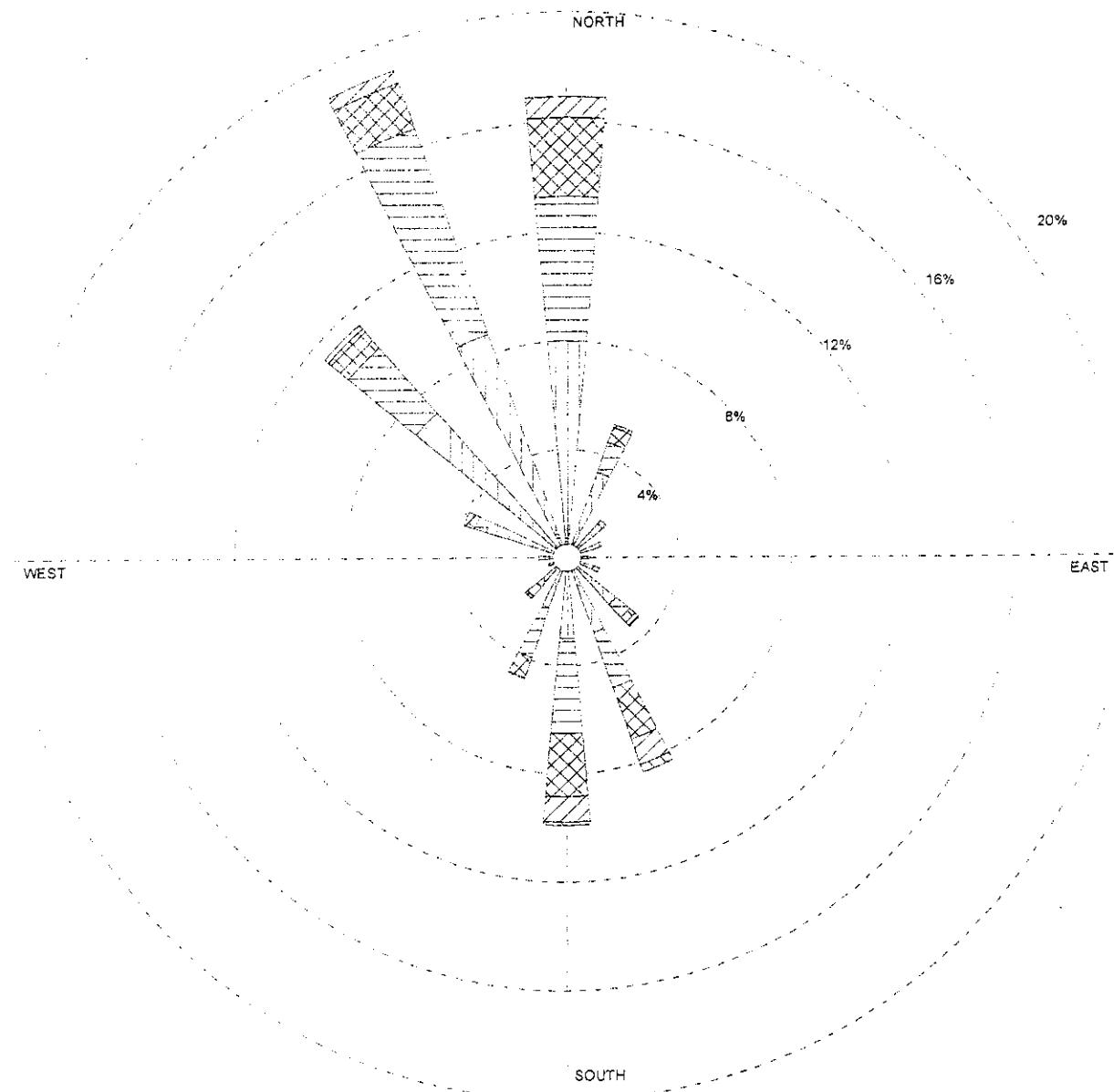
STATION #24257 - REDDING/AAF, CA



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/5/2001	
> 10.8	DISPLAY	COMMENTS
8.8-10.8	Wind Speed	m/s
5.7- 8.8	Avg Wind Speed	CALM WINDS
3.6- 5.7	3.53 m/s	15.53%
2.1- 3.6		
0.5- 2.1	ORIENTATION Direction (blowing from)	PLOT YEAR-DATE-TIME 19 July 1 - September 30 Midnight - 11 PM
		PROJECT/PLOT NO. 3q1991

WIND ROSE PLOT

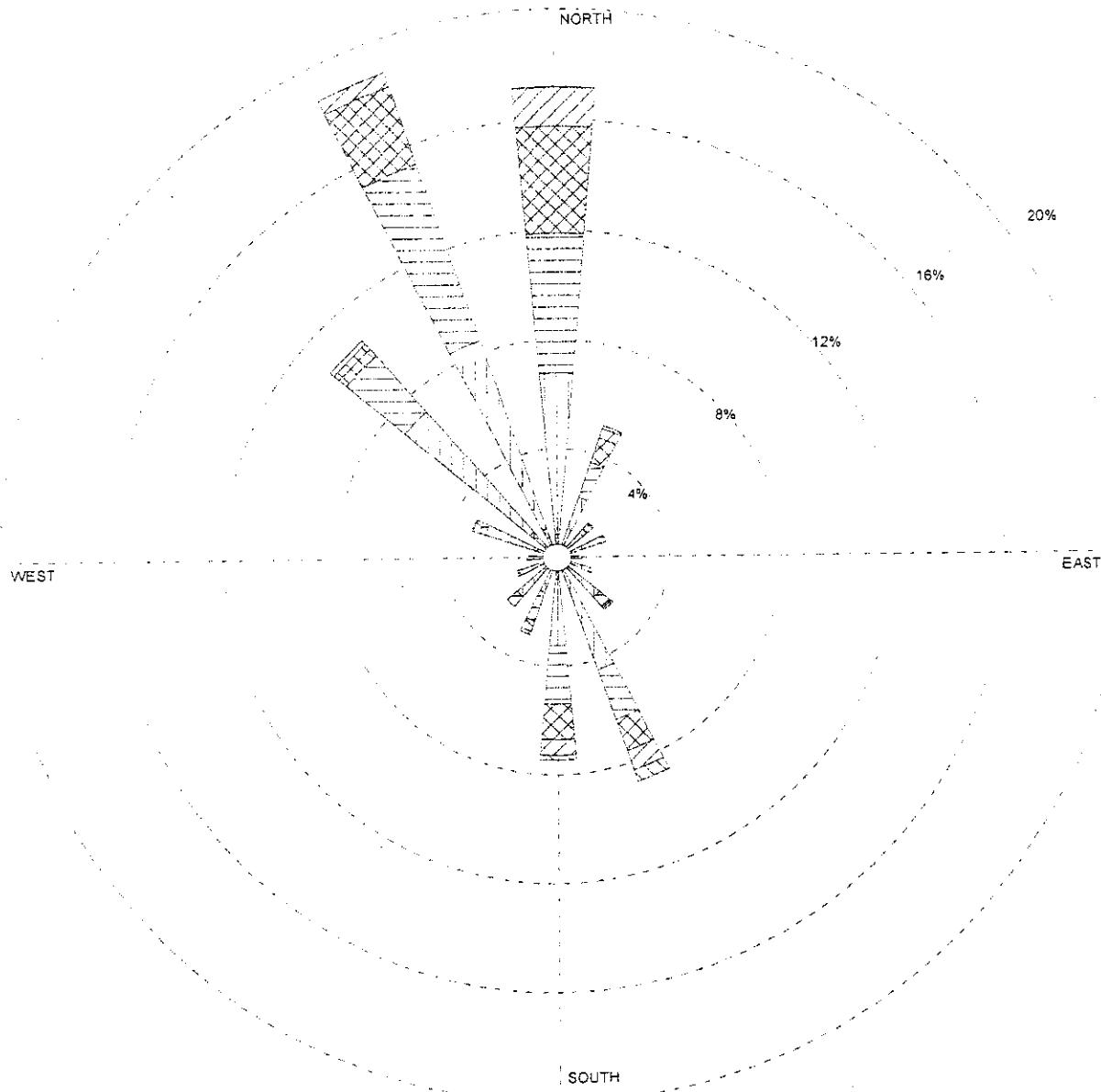
STATION #24216 - RED BLUFF/MUNICIPAL ARPT, CA



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/10/2001	
> 10.8	DISPLAY	COMMENTS
8.8-10.8	Wind Speed	m/s
5.7- 8.8	Avg Wind Speed	CALM WINDS
3.6- 5.7	3.94 m/s	7.52%
2.1- 3.6		
0.5- 2.1	ORIENTATION Direction (blowing from)	PLOT YEAR-DATE-TIME PROJECT/PLOT NO.
		19 October 1 - December 31 Midnight - 11 PM 4q1984

WIND ROSE PLOT

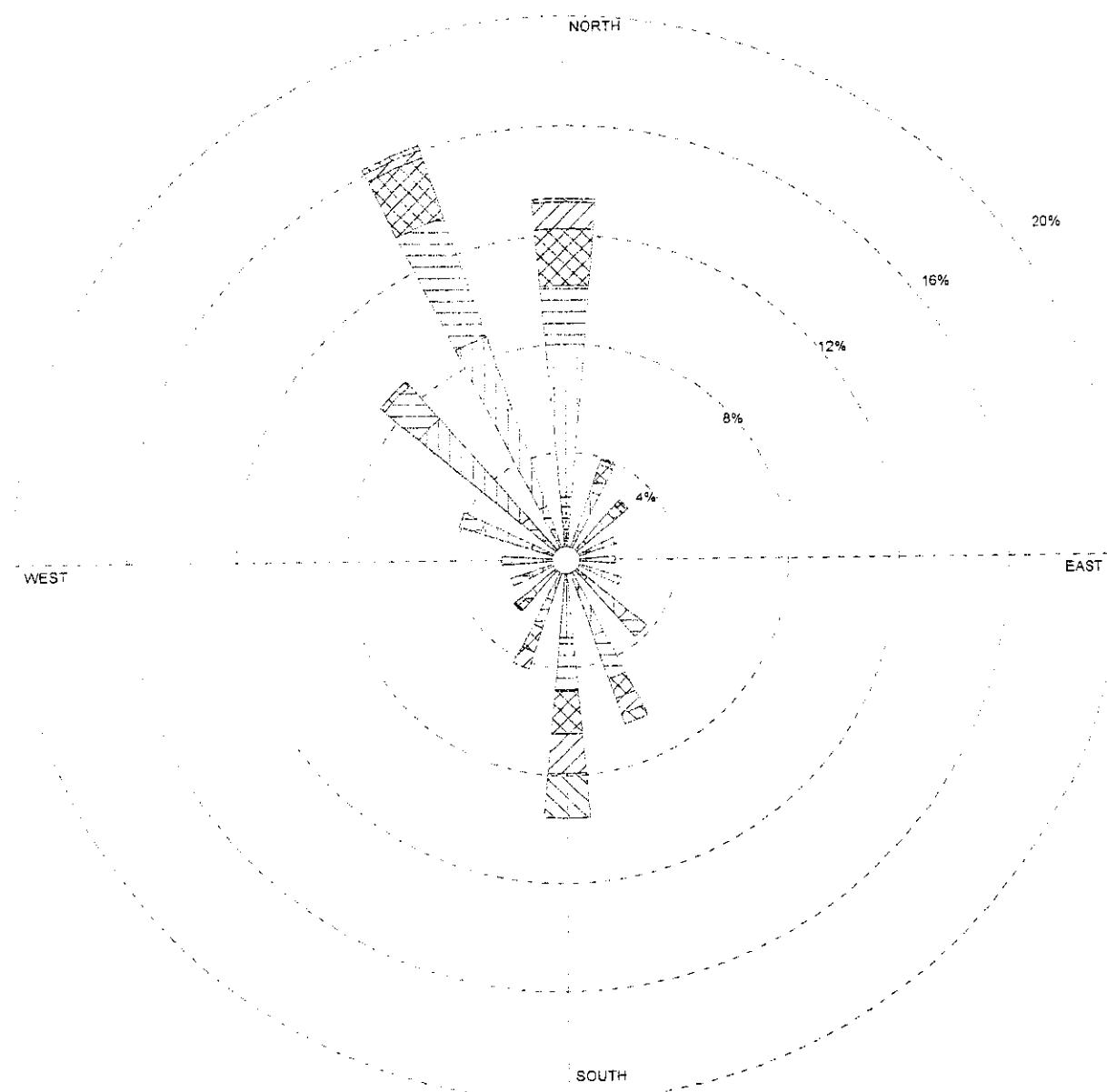
STATION #24216 - RED BLUFF/MUNICIPAL ARPT, CA



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/10/2001	
> 10.8	DISPLAY	COMMENTS
8.8-10.8	Wind Speed	m/s
5.7-8.8	AVG. WIND SPEED	CALM WINDS
3.6-5.7	3.87 m/s	11.82%
2.1-3.6	ORIENTATION	PROJECT/PLOT NO.
0.5-2.1	Direction (blowing from)	19 October 1 - December 31 Midnight - 11 PM
		4q1985

WND ROSE PLOT

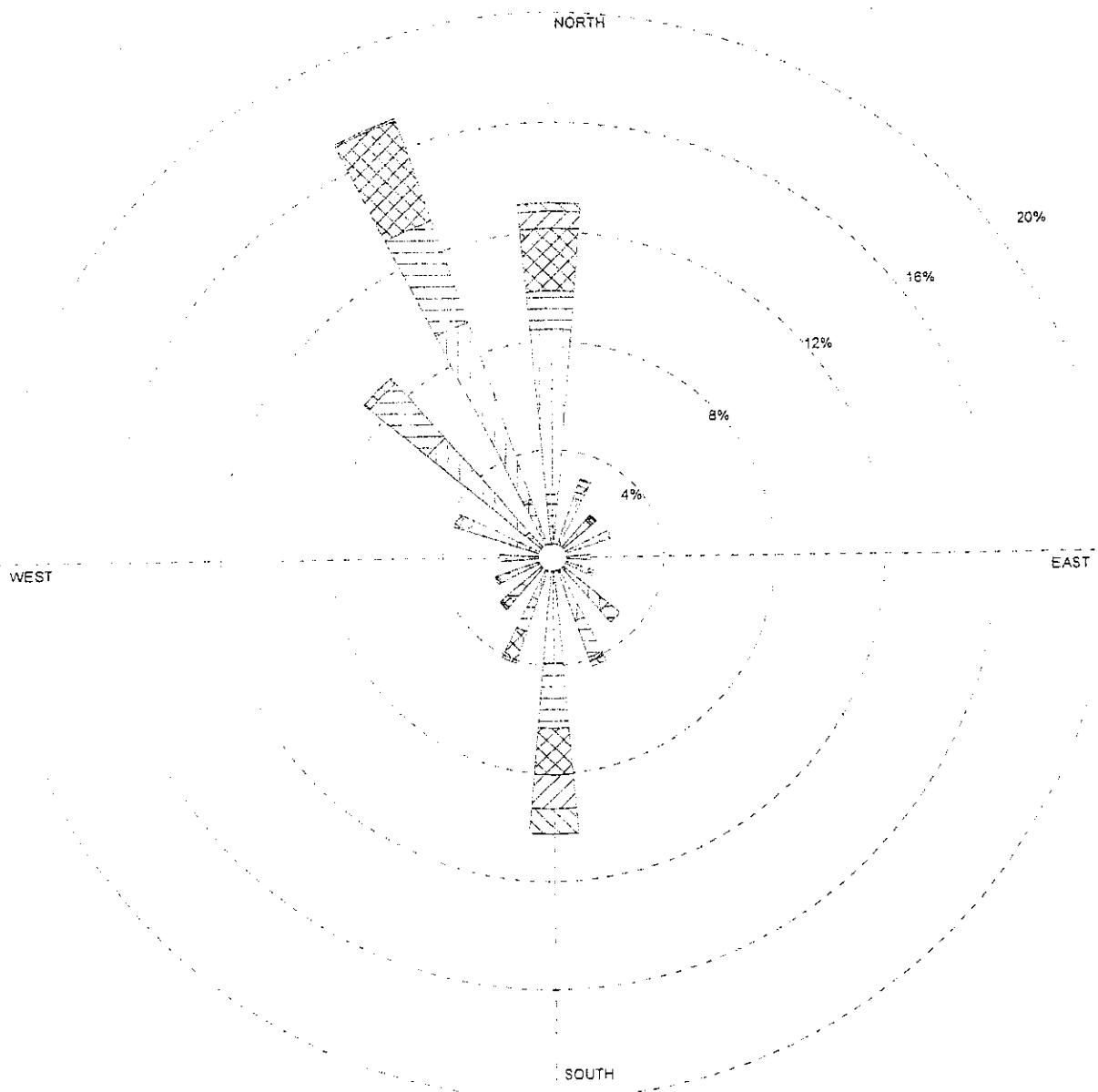
STATION #24257 - REDDING/AAF, CA



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/5/2001	
> 10.6 DISPLAY		COMMENTS
8.8-10.6 Wind Speed	m/s	
5.7-8.5 AVG WIND SPEED	CALM WINDS	
3.5-5.7 3.79 m/s	13.00%	
2.1-3.6		
0.5-2.1 ORIENTATION	PLOT YEAR-DATE-TIME	PROJECT/PLOT NO.
Direction (blowing from)	19 October 1 - December 31 Midnight - 11 PM	4q1987

WIND ROSE PLOT

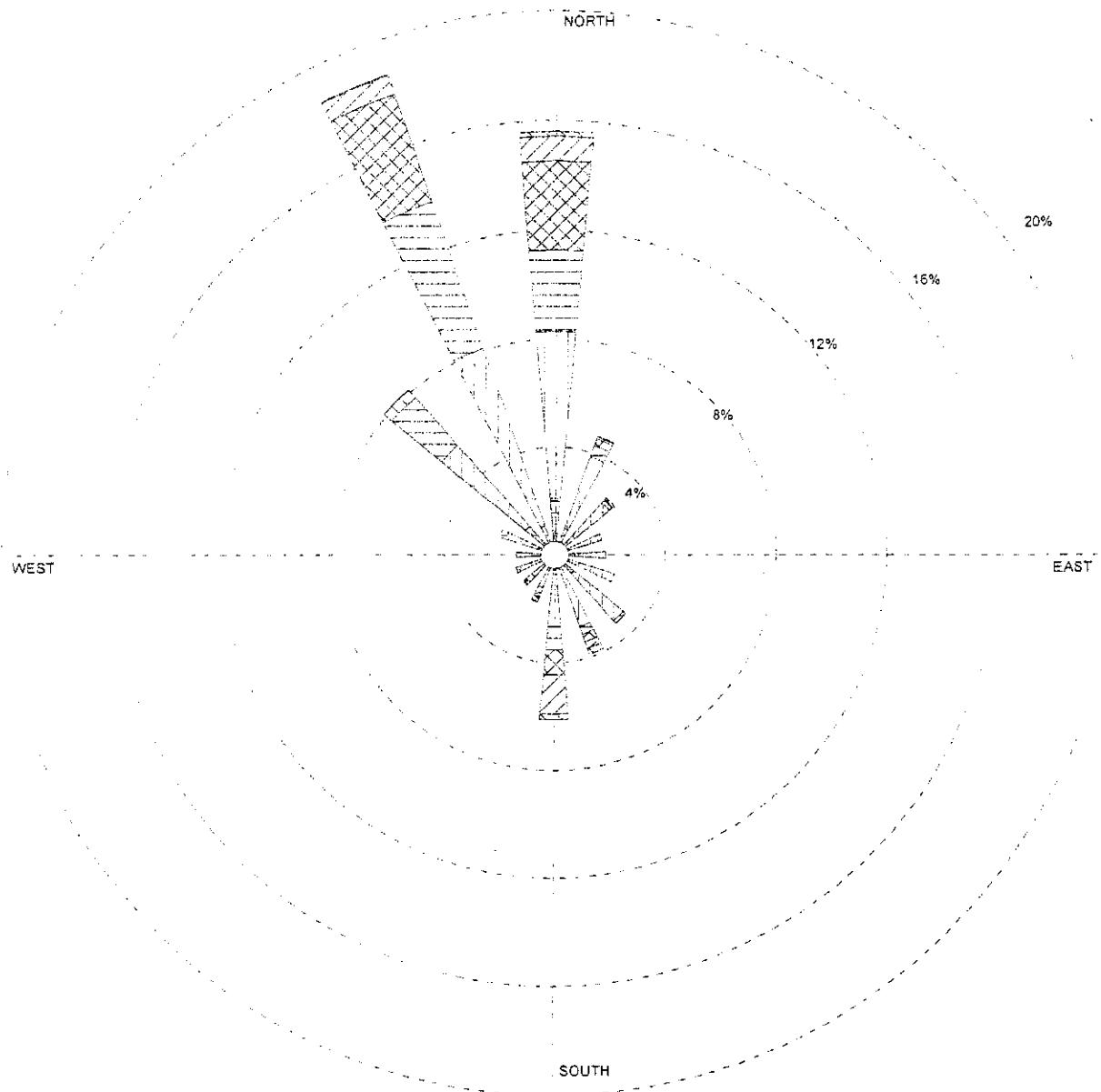
STATION #24257 - REDDING/AAF, CA



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/5/2001	
> 10.8	DISPLAY	COMMENTS
6.8-10.8	Wind Speed	m/s
5.7-8.8	Avg Wind Speed	CALM WINDS
3.6-5.7	3.63 m/s	17.62%
2.1-3.6		
0.5-2.1	ORIENTATION	PLOT YEAR-DATE-TIME
	Direction (blowing from)	19 October 1 - December 31 Midnight - 11 PM
		PROJECT/PLOT NO. 4q1988

WIND ROSE PLOT

STATION #24257 - REDDING/AAF, CA



MODELER

DATE

COMPANY NAME

Wind Speed (m/s)

4/5/2001



> 10.8

DISPLAY

UNIT

COMMENTS

8.8-10.8

Wind Speed

m/s

5.7-8.8

AVG WIND SPEED

CALM WINDS

3.6-5.7

3.61 m/s

21.83%

2.1-3.6

0.5-2.1

ORIENTATION

PLOT-YEAR-DATE-TIME

PROJECT/PLOT NO.

Direction

(blowing from)

19

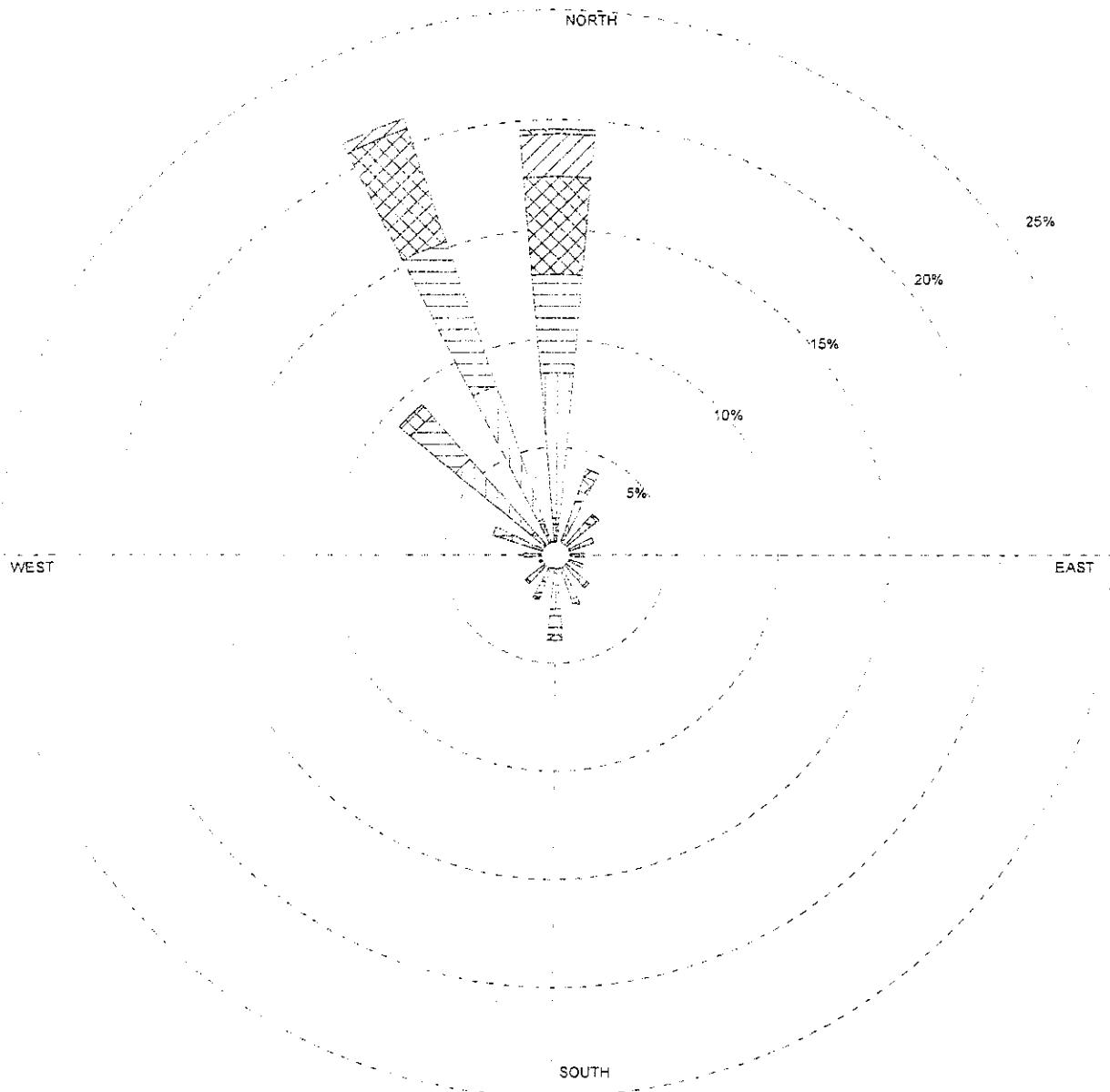
October 1 - December 31

4q1989

Midnight - 11 PM

WIND ROSE PLOT

STATION #24257 - REDDING/AAF, CA



MODELER

DATE

COMPANY NAME

Wind Speed (m/s)

4/5/2001



> 10.8 DISPLAY

UNIT

COMMENTS

8.8-10.8 Wind Speed

m/s

5.7-8.8 AVG WIND SPEED

CALM WINDS

3.6-5.7 3.77 m/s

20.15%

2.1-3.6

0.5-2.1 ORIENTATION

PLOT YEAR-DATE-TIME

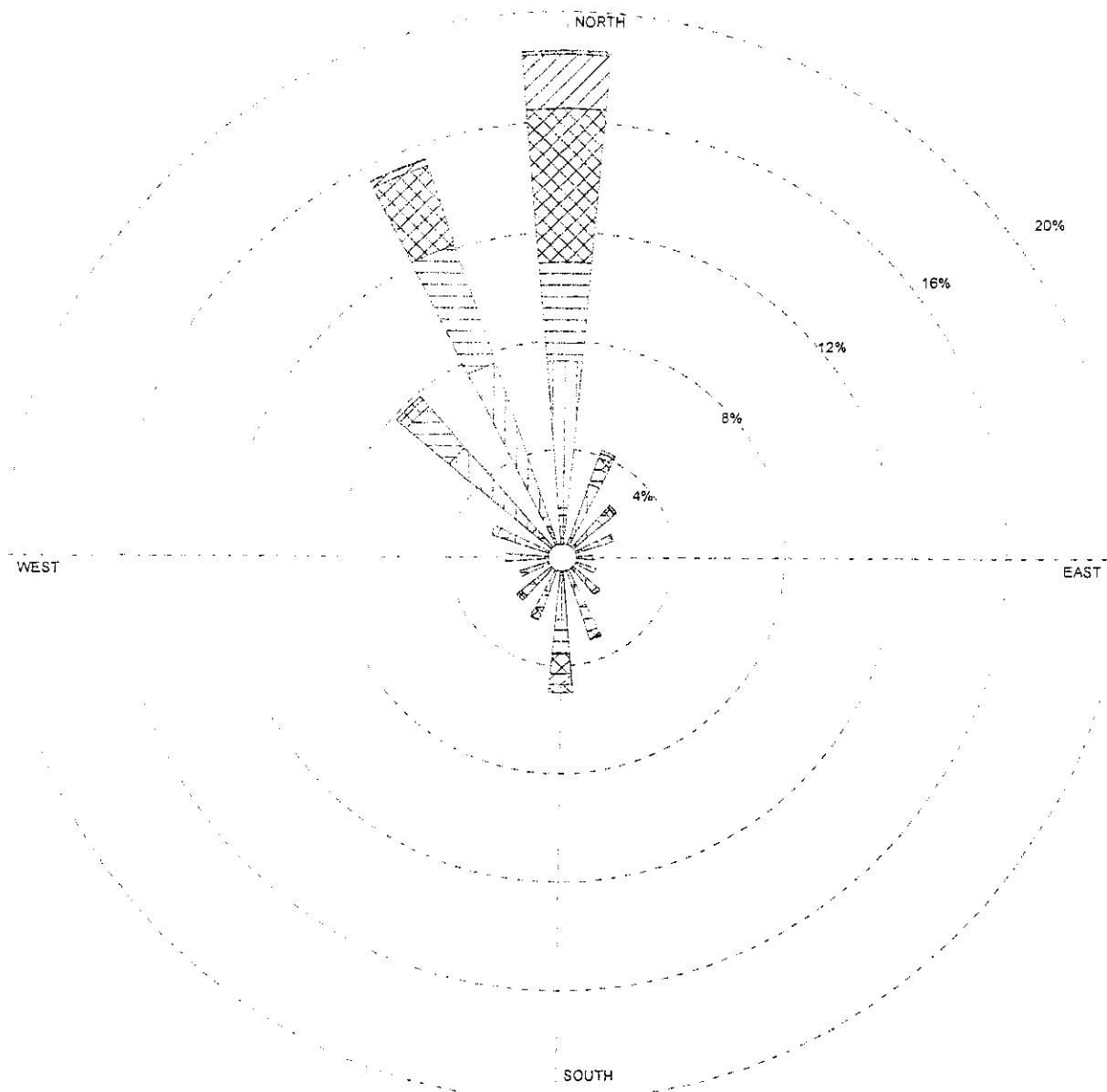
PROJECT/PLOT NO.

Direction
(blowing from)19
October 1 - December 31
Midnight - 11 PM

4q1990

WIND ROSE PLOT

STATION #24257 - REDDING/AAF, CA



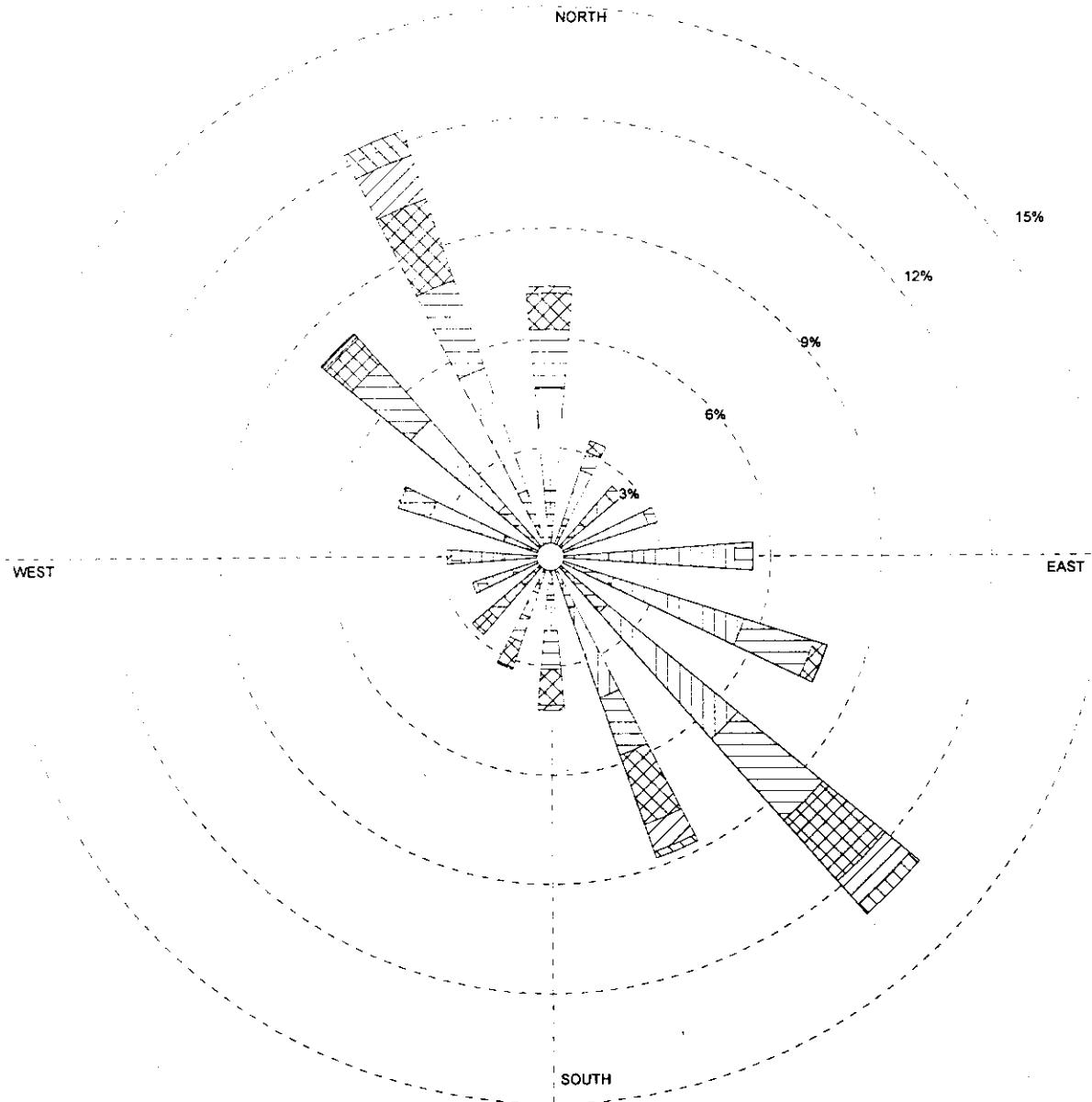
MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	4/5/2001	
> 10.8	DISPLAY	COMMENTS
8.8-10.8	Wind Speed	m/s
6.7-8.8	Avg Wind Speed	CALM WINDS
3.6-5.7	3.81 m/s	25.18%
2.1-3.6		
0.5-2.1	ORIENTATION Direction (blowing from)	PLOT YEAR-DATE-TIME PROJECT/PLOT NO.
		19 October 1 - December 31 Midnight - 11 PM
		4q1991

APPENDIX G3

METEOROLOGICAL DATA

WIND ROSE PLOT

Maxwell Station



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	5/17/2001	
> 10.8	DISPLAY	
8.8-10.8	Wind Speed	COMMENTS
5.7-8.8	AVG WIND SPEED	
3.6-5.7	3.53 m/s	7.48%
2.1-3.6		
0.5-2.1	ORIENTATION Direction (blowing from)	PLOT YEAR-DATE-TIME 96 January 1 - December 31 Midnight - 11 PM
		PROJECT/PLOT NO. annual 1996

Station ID : 0
 Years : 1996
 Start Date : January 1
 Start Time : Midnight
 RUN ID :
 End Date : December 31
 End Time : 11 PM

Frequency Distribution
 (Count)

Wind Direction (Blowing From) / Wind Speed (m/s)

	0.51-2.06	2.06-3.60	3.60-5.66	5.66-8.75	8.75-10.80	>10.80	Total
N	161	247	141	87	17	1	654
NNE	100	123	47	29	0	0	299
NE	110	92	27	1	0	0	230
ENE	102	147	23	0	0	0	272
E	140	303	44	2	0	0	489
ESE	160	329	173	34	2	0	698
SE	179	407	263	194	76	31	1150
SSE	132	228	147	179	70	16	772
S	105	74	94	87	13	0	373
SSW	93	62	62	66	5	0	288
SW	94	55	49	44	9	1	252
WSW	98	68	25	11	1	0	203
W	117	100	25	11	0	0	253
WNW	120	185	80	4	1	0	390
NW	166	274	182	78	14	5	719
NNW	171	312	223	206	110	63	1085
Total	2048	3006	1605	1033	318	117	

Frequency of Calm Winds : 657

Average Wind Speed : 3.53 m/s

Station ID : 0
Years : 1996
Start Date : January 1
Start Time : Midnight

RUN ID :
End Date : December 31
End Time : 11 PM

Frequency Distribution
(Normalized)

Wind Direction (Blowing From) / Wind Speed (m/s)

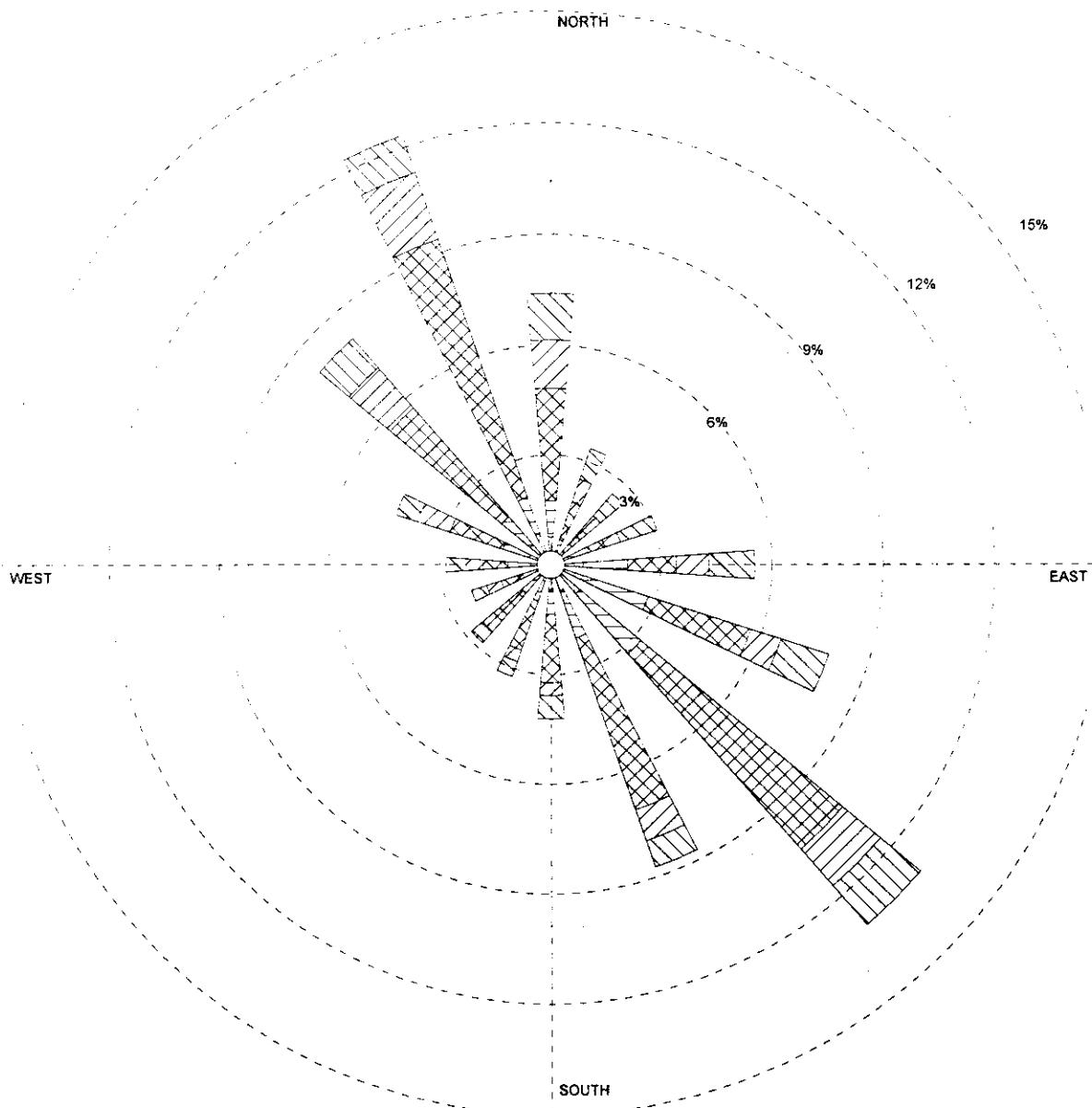
	0.51-2.06	2.06-3.60	3.60-5.66	5.66-8.75	8.75-10.80	>10.80	Total
N	0.018329	0.028119	0.016052	0.009904	0.001935	0.000114	0.074454
NNE	0.011384	0.014003	0.005351	0.003301	0.000000	0.000000	0.034039
NE	0.012523	0.010474	0.003074	0.000114	0.000000	0.000000	0.026184
ENE	0.011612	0.016735	0.002618	0.000000	0.000000	0.000000	0.030965
E	0.015938	0.034495	0.005009	0.000228	0.000000	0.000000	0.055669
ESE	0.018215	0.037454	0.019695	0.003871	0.000228	0.000000	0.079463
SE	0.020378	0.046334	0.029941	0.022086	0.008652	0.003529	0.130920
SSE	0.015027	0.025956	0.016735	0.020378	0.007969	0.001821	0.087887
S	0.011954	0.008424	0.010701	0.009904	0.001480	0.000000	0.042464
SSW	0.010587	0.007058	0.007058	0.007514	0.000569	0.000000	0.032787
SW	0.010701	0.006261	0.005578	0.005009	0.001025	0.000114	0.028689
WSW	0.011157	0.007741	0.002846	0.001252	0.000114	0.000000	0.023110
W	0.013320	0.011384	0.002846	0.001252	0.000000	0.000000	0.028802
WNW	0.013661	0.021061	0.009107	0.000455	0.000114	0.000000	0.044399
NW	0.018898	0.031193	0.020719	0.008880	0.001594	0.000569	0.081853
NNW	0.019467	0.035519	0.025387	0.023452	0.012523	0.007172	0.123520
Total	0.233151	0.342213	0.182719	0.117600	0.036202	0.013320	

Frequency of Calm Winds : 7.48%

Average Wind Speed : 3.53 m/s

WIND ROSE PLOT

Maxwell Station



Stability Class	MODELER	DATE	COMPANY NAME
F		5/17/2001	
E	DISPLAY	UNIT	COMMENTS
D	Stability Classes	N/A	
C	AVG. WIND SPEED	CALM WINDS	
B	3.53 m/s	7.48%	
A	ORIENTATION Direction (blowing from)	PLOT YEAR-DATE-TIME 96 January 1 - December 31 Midnight - 11 PM	PROJECT/PLOT NO. annual 1996

Station ID : 0
Years : 1996
Start Date : January 1
Start Time : Midnight

RUN ID :
End Date : December 31
End Time : 11 PM

Frequency Distribution
(Count)

Wind Direction (Blowing From) / Stability Classes

	A	B	C	D	E	F	Total
N	23	46	88	269	117	111	654
NNE	18	21	27	97	58	78	299
NE	14	32	23	45	45	71	230
ENE	17	30	48	45	40	92	272
E	15	65	106	116	77	110	489
ESE	18	64	165	256	76	119	698
SE	22	72	190	624	117	125	1150
SSE	20	47	121	437	80	67	772
S	18	44	58	165	31	57	373
SSW	9	34	52	125	29	39	288
SW	14	26	54	87	35	36	252
WSW	16	19	38	53	38	39	203
W	13	36	56	59	41	48	253
WNW	9	45	68	132	83	53	390
NW	20	44	90	344	128	93	719
NNW	23	59	91	651	168	93	1085
Total	269	684	1275	3505	1163	1231	

Frequency of Calm Winds : 657

Average Wind Speed : 3.53 m/s

Station ID : 0
 Years : 1996
 Start Date : January 1
 Start Time : Midnight
 RUN ID :
 End Date : December 31
 End Time : 11 PM

Frequency Distribution
(Normalized)

Wind Direction (Blowing From) / Stability Classes

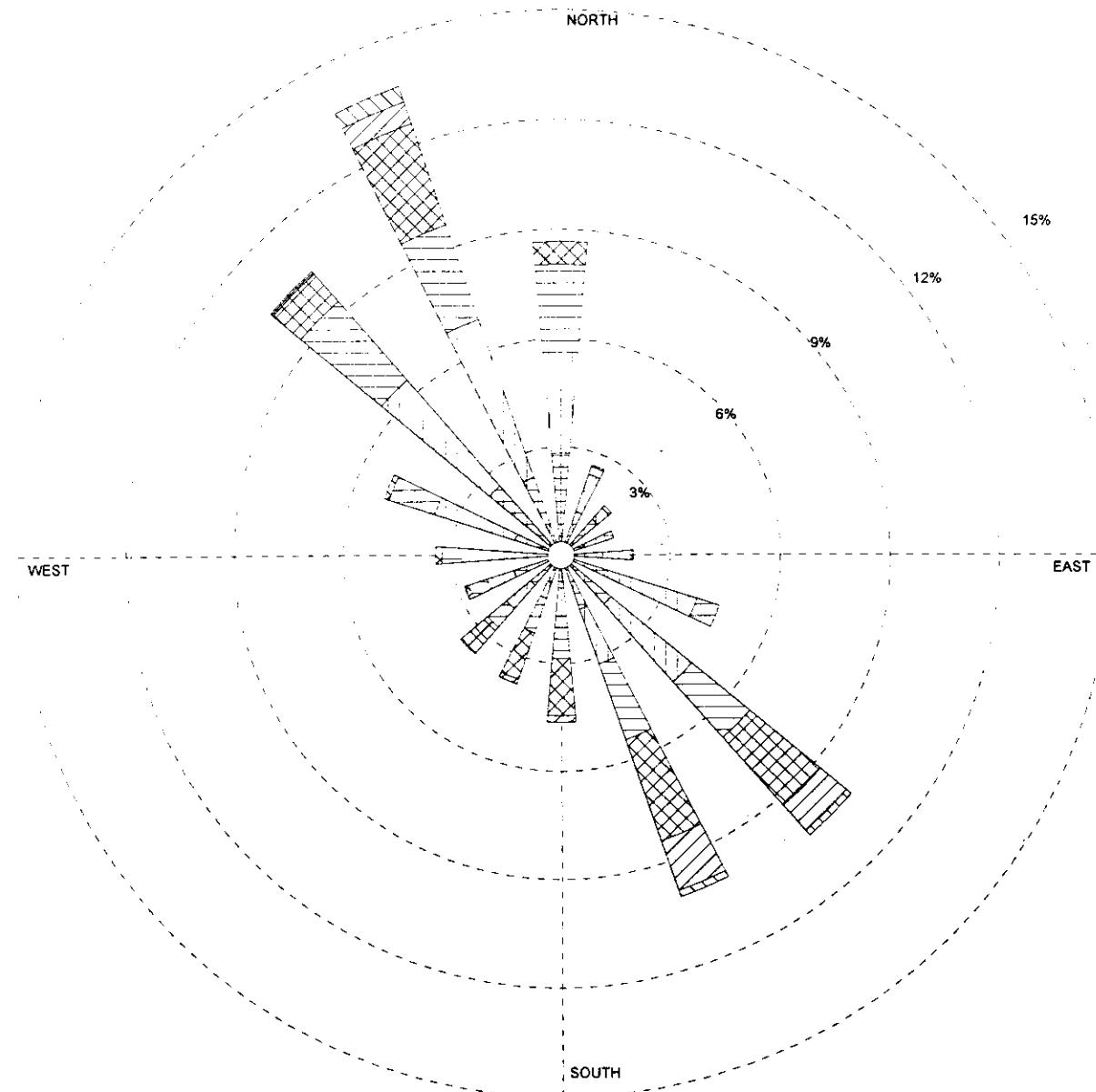
	A	B	C	D	E	F	Total
N	0.002618	0.005237	0.010018	0.030624	0.013320	0.012637	0.074454
NNE	0.002049	0.002391	0.003074	0.011043	0.006603	0.008880	0.034039
NE	0.001594	0.003643	0.002618	0.005123	0.005123	0.008083	0.026184
ENE	0.001935	0.003415	0.005464	0.005123	0.004554	0.010474	0.030965
E	0.001708	0.007400	0.012067	0.013206	0.008766	0.012523	0.055669
ESE	0.002049	0.007286	0.018784	0.029144	0.008652	0.013547	0.079463
SE	0.002505	0.008197	0.021630	0.071038	0.013320	0.014230	0.130920
SSE	0.002277	0.005351	0.013775	0.049750	0.009107	0.007628	0.087887
S	0.002049	0.005009	0.006603	0.018784	0.003529	0.006489	0.042464
SSW	0.001025	0.003871	0.005920	0.014230	0.003301	0.004440	0.032787
SW	0.001594	0.002960	0.006148	0.009904	0.003985	0.004098	0.028689
WSW	0.001821	0.002163	0.004326	0.006034	0.004326	0.004440	0.023110
W	0.001480	0.004098	0.006375	0.006717	0.004668	0.005464	0.028802
WNW	0.001025	0.005123	0.007741	0.015027	0.009449	0.006034	0.044399
NW	0.002277	0.005009	0.010246	0.039162	0.014572	0.010587	0.081853
NNW	0.002618	0.006717	0.010360	0.074112	0.019126	0.010587	0.123520
Total	0.030624	0.077869	0.145150	0.399021	0.132400	0.140141	

Frequency of Calm Winds : 7.48%

Average Wind Speed : 3.53 m/s

WIND ROSE PLOT

Maxwell Station



Wind Speed (m/s)	MODELER	DATE	COMPANY NAME
> 10.8		5/17/2001	
8.8-10.8	DISPLAY	UNIT	COMMENTS
5.7-8.8	Wind Speed	m/s	
3.6-5.7	AVG. WIND SPEED	CALM WINDS	
2.1-3.6	3.65 m/s	10.53%	
0.5-2.1	ORIENTATION	PLOT YEAR-DATE-TIME	PROJECT/PLOT NO.
	Direction (blowing from)	96 January 1 - March 31 Midnight - 11 PM	1Q 1996

Station ID : 0
Years : 1996
Start Date : January 1
Start Time : Midnight

RUN ID :
End Date : March 31
End Time : 11 PM

Frequency Distribution
(Count)

Wind Direction (Blowing From) / Wind Speed (m/s)

	0.51-2.06	2.06-3.60	3.60-5.66	5.66-8.75	8.75-10.80	>10.80	Total
N	62	61	53	14	0	0	190
NNE	28	24	5	1	0	0	58
NE	29	9	2	0	0	0	40
ENE	15	14	5	0	0	0	34
E	25	17	1	1	0	0	44
ESE	29	57	14	0	0	0	100
SE	39	63	45	55	20	4	226
SSE	35	35	49	65	32	4	220
S	20	17	26	35	4	0	102
SSW	18	10	22	30	3	0	83
SW	24	19	15	14	7	1	80
WSW	30	17	12	2	1	0	62
W	33	27	12	4	0	0	76
WNW	29	51	29	3	0	0	112
NW	56	85	63	22	1	1	228
NNW	50	101	60	64	14	10	299
Total	522	607	413	310	82	20	

Frequency of Calm Winds : 230

Average Wind Speed : 3.65 m/s

Station ID : 0
Years : 1996
Start Date : January 1
Start Time : Midnight

RUN ID :
End Date : March 31
End Time : 11 PM

Frequency Distribution
(Normalized)

Wind Direction (Blowing From) / Wind Speed (m/s)

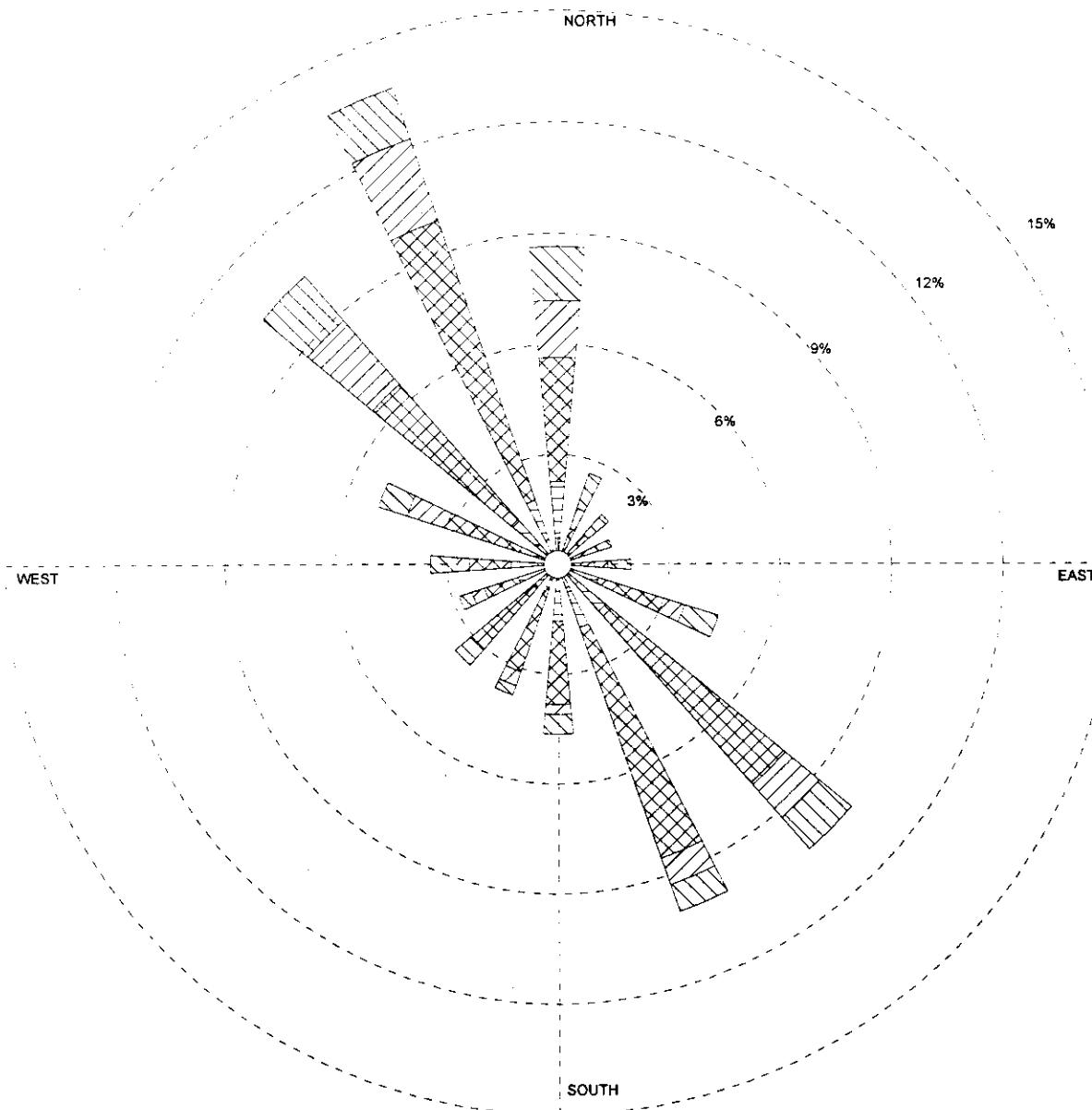
	0.51-2.06	2.06-3.60	3.60-5.66	5.66-8.75	8.75-10.80	>10.80	Total
N	0.028388	0.027930	0.024267	0.006410	0.000000	0.000000	0.086996
NNE	0.012821	0.010989	0.002289	0.000458	0.000000	0.000000	0.026557
NE	0.013278	0.004121	0.000916	0.000000	0.000000	0.000000	0.018315
ENE	0.006868	0.006410	0.002289	0.000000	0.000000	0.000000	0.015568
E	0.011447	0.007784	0.000458	0.000458	0.000000	0.000000	0.020147
ESE	0.013278	0.026099	0.006410	0.000000	0.000000	0.000000	0.045788
SE	0.017857	0.028846	0.020604	0.025183	0.009158	0.001832	0.103480
SSE	0.016026	0.016026	0.022436	0.029762	0.014652	0.001832	0.100733
S	0.009158	0.007784	0.011905	0.016026	0.001832	0.000000	0.046703
SSW	0.008242	0.004579	0.010073	0.013736	0.001374	0.000000	0.038004
SW	0.010989	0.008700	0.006868	0.006410	0.003205	0.000458	0.036630
WSW	0.013736	0.007784	0.005495	0.000916	0.000458	0.000000	0.028388
W	0.015110	0.012363	0.005495	0.001832	0.000000	0.000000	0.034799
WNW	0.013278	0.023352	0.013278	0.001374	0.000000	0.000000	0.051282
NW	0.025641	0.038919	0.028846	0.010073	0.000458	0.000458	0.104396
NNW	0.022894	0.046245	0.027473	0.029304	0.006410	0.004579	0.136905
Total	0.239011	0.277930	0.189103	0.141941	0.037546	0.009158	

Frequency of Calm Winds : 10.53%

Average Wind Speed : 3.65 m/s

WIND ROSE PLOT

Maxwell Station



Stability Class	MODELER	DATE	COMPANY NAME
F		5/17/2001	
E	DISPLAY	UNIT	COMMENTS
D	Stability Classes	N/A	
C	AVG. WIND SPEED	CALM WINDS	
B	3.65 m/s	10.53%	
A	ORIENTATION Direction (blowing from)	PLOT YEAR-DATE-TIME 96 January 1 - March 31 Midnight - 11 PM	PROJECT/PLOT NO. 1Q 1996

Station ID : 0
Years : 1996
Start Date : January 1
Start Time : Midnight

RUN ID :
End Date : March 31
End Time : 11 PM

Frequency Distribution
(Count)

Wind Direction (Blowing From) / Stability Classes

	A	B	C	D	E	F	Total
N	6	10	34	74	34	32	190
NNE	1	3	3	16	13	22	58
NE	4	3	2	8	7	16	40
ENE	2	2	5	7	9	9	34
E	1	6	7	8	8	14	44
ESE	6	4	16	40	13	21	100
SE	5	11	21	138	26	25	226
SSE	6	9	25	146	17	17	220
S	5	4	25	50	6	12	102
SSW	1	9	5	53	9	6	83
SW	3	6	9	41	8	13	80
WSW	2	5	18	21	8	8	62
W	3	9	16	25	7	16	76
WNW	1	9	14	46	24	18	112
NW	4	12	19	108	50	35	228
NNW	5	11	25	175	51	32	299
Total	55	113	244	956	290	296	

Frequency of Calm Winds : 230
Average Wind Speed : 3.65 m/s

Station ID : 0
Years : 1996
Start Date : January 1
Start Time : Midnight

RUN ID :
End Date : March 31
End Time : 11 PM

Frequency Distribution
(Normalized)

Wind Direction (Blowing From) / Stability Classes

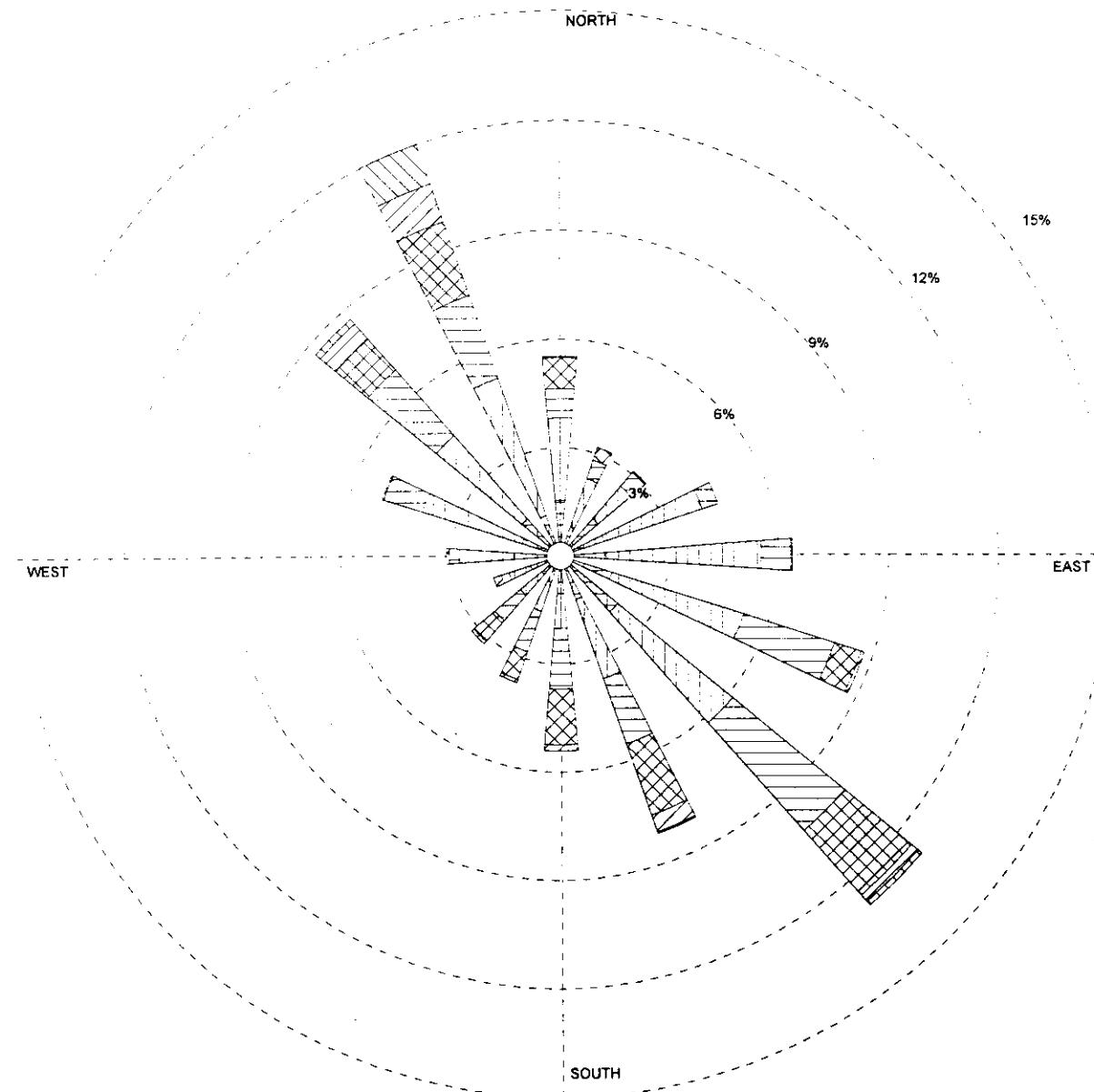
	A	B	C	D	E	F	Total
N	0.002747	0.004579	0.015568	0.033883	0.015568	0.014652	0.086996
NNE	0.000458	0.001374	0.001374	0.007326	0.005952	0.010073	0.026557
NE	0.001832	0.001374	0.000916	0.003663	0.003205	0.007326	0.018315
ENE	0.000916	0.000916	0.002289	0.003205	0.004121	0.004121	0.015568
E	0.000458	0.002747	0.003205	0.003663	0.003663	0.006410	0.020147
ESE	0.002747	0.001832	0.007326	0.018315	0.005952	0.009615	0.045788
SE	0.002289	0.005037	0.009615	0.063187	0.011905	0.011447	0.103480
SSE	0.002747	0.004121	0.011447	0.066850	0.007784	0.007784	0.100733
S	0.002289	0.001832	0.011447	0.022894	0.002747	0.005495	0.046703
SSW	0.000458	0.004121	0.002289	0.024267	0.004121	0.002747	0.038004
SW	0.001374	0.002747	0.004121	0.018773	0.003663	0.005952	0.036630
WSW	0.000916	0.002289	0.008242	0.009615	0.003663	0.003663	0.028388
W	0.001374	0.004121	0.007326	0.011447	0.003205	0.007326	0.034799
WNW	0.000458	0.004121	0.006410	0.021062	0.010989	0.008242	0.051282
NW	0.001832	0.005495	0.008700	0.049451	0.022894	0.016026	0.104396
NNW	0.002289	0.005037	0.011447	0.080128	0.023352	0.014652	0.136905
Total	0.025183	0.051740	0.111722	0.437729	0.132784	0.135531	

Frequency of Calm Winds : 10.53%

Average Wind Speed : 3.65 m/s

WIND ROSE PLOT

Maxwell Station



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	5/17/2001	
> 10.8		
8.8-10.8		
5.7- 8.8		
3.6- 5.7		
2.1- 3.6		
0.5- 2.1		
DISPLAY Wind Speed	UNIT m/s	COMMENTS
AVG. WIND SPEED 3.62 m/s	CALM WINDS 3.71%	
ORIENTATION Direction (blowing from)	PLOT YEAR-DATE-TIME 96 April 1 - June 30 Midnight - 11 PM	PROJECT/PLOT NO. 2Q 1996

Station ID : 0
Years : 1996
Start Date : April 1
Start Time : Midnight

RUN ID :
End Date : June 30
End Time : 11 PM

Frequency Distribution
(Count)

Wind Direction (Blowing From) / Wind Speed (m/s)

	0.51-2.06	2.06-3.60	3.60-5.66	5.66-8.75	8.75-10.80	>10.80	Total
N	34	50	18	19	1	0	122
NNE	19	31	12	8	0	0	70
NE	30	26	11	1	0	0	68
ENE	28	62	10	0	0	0	100
E	27	94	18	1	0	0	140
ESE	33	83	57	17	2	0	192
SE	45	90	87	52	5	3	282
SSE	28	51	42	46	11	1	179
S	23	21	37	34	4	0	119
SSW	17	19	26	18	2	0	82
SW	15	17	20	17	2	0	71
WSW	19	14	5	5	0	0	43
W	28	33	6	2	0	0	69
WNW	24	63	24	1	0	0	112
NW	30	67	53	25	12	4	191
NNW	26	88	53	47	24	25	263
Total	426	809	479	293	63	33	

Frequency of Calm Winds : 81

Average Wind Speed : 3.62 m/s

Station ID : 0
Years : 1996
Start Date : April 1
Start Time : Midnight

RUN ID :
End Date : June 30
End Time : 11 PM

Frequency Distribution
(Normalized)

Wind Direction (Blowing From) / Wind Speed (m/s)

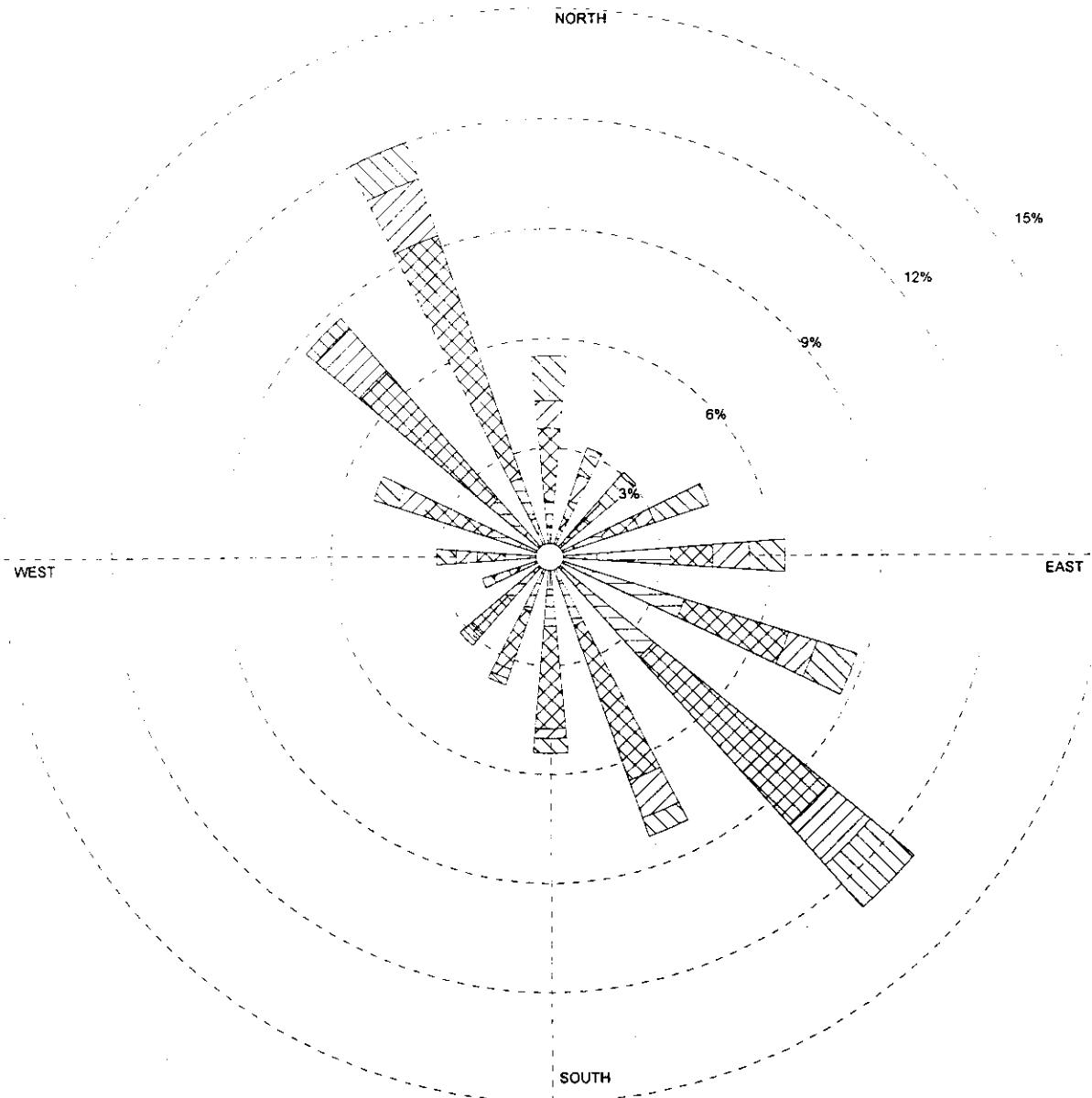
	0.51-2.06	2.06-3.60	3.60-5.66	5.66-8.75	8.75-10.80	>10.80	Total
N	0.015568	0.022894	0.008242	0.008700	0.000458	0.000000	0.055861
NNE	0.008700	0.014194	0.005495	0.003663	0.000000	0.000000	0.032051
NE	0.013736	0.011905	0.005037	0.000458	0.000000	0.000000	0.031136
ENE	0.012821	0.028388	0.004579	0.000000	0.000000	0.000000	0.045788
E	0.012363	0.043040	0.008242	0.000458	0.000000	0.000000	0.064103
ESE	0.015110	0.038004	0.026099	0.007784	0.000916	0.000000	0.087912
SE	0.020604	0.041209	0.039835	0.023810	0.002289	0.001374	0.129121
SSE	0.012821	0.023352	0.019231	0.021062	0.005037	0.000458	0.081960
S	0.010531	0.009615	0.016941	0.015568	0.001832	0.000000	0.054487
SSW	0.007784	0.008700	0.011905	0.008242	0.000916	0.000000	0.037546
SW	0.006868	0.007784	0.009158	0.007784	0.000916	0.000000	0.032509
WSW	0.008700	0.006410	0.002289	0.002289	0.000000	0.000000	0.019689
W	0.012821	0.015110	0.002747	0.000916	0.000000	0.000000	0.031593
WNW	0.010989	0.028846	0.010989	0.000458	0.000000	0.000000	0.051282
NW	0.013736	0.030678	0.024267	0.011447	0.005495	0.001832	0.087454
NNW	0.011905	0.040293	0.024267	0.021520	0.010989	0.011447	0.120421
Total	0.195055	0.370421	0.219322	0.134158	0.028846	0.015110	

Frequency of Calm Winds : 3.71%

Average Wind Speed : 3.62 m/s

WIND ROSE PLOT

Maxwell Station



Stability Class	MODELER	DATE	COMPANY NAME
F	DISPLAY	UNIT	COMMENTS
E	Stability Classes	N/A	
D	AVG. WIND SPEED	CALM WINDS	
C	3.62 m/s	3.71%	
B	ORIENTATION	PLOT YEAR-DATE-TIME	PROJECT/PLOT NO.
A	Direction (blowing from)	96 April 1 - June 30 Midnight - 11 PM	2Q 1996

Station ID : 0
Years : 1996
Start Date : April 1
Start Time : Midnight

RUN ID :
End Date : June 30
End Time : 11 PM

Frequency Distribution
(Count)

Wind Direction (Blowing From) / Stability Classes

	A	B	C	D	E	F	Total
N	4	14	16	44	17	27	122
NNE	3	3	6	24	17	17	70
NE	4	8	5	15	13	23	68
ENE	3	13	18	22	10	34	100
E	7	28	37	25	22	21	140
ESE	2	25	57	65	18	25	192
SE	6	18	57	135	32	34	282
SSE	6	10	28	99	24	12	179
S	3	17	22	62	6	9	119
SSW	2	9	24	37	6	4	82
SW	5	8	22	27	2	7	71
WSW	5	3	11	7	10	7	43
W	3	9	15	17	13	12	69
WNW	2	17	19	42	17	15	112
NW	7	13	27	102	34	8	191
NNW	8	17	26	153	36	23	263
Total	70	212	390	876	277	278	

Frequency of Calm Winds : 81

Average Wind Speed : 3.62 m/s

Station ID : 0
 Years : 1996
 Start Date : April 1
 Start Time : Midnight
 RUN ID :
 End Date : June 30
 End Time : 11 PM

Frequency Distribution
 (Normalized)

Wind Direction (Blowing From) / Stability Classes

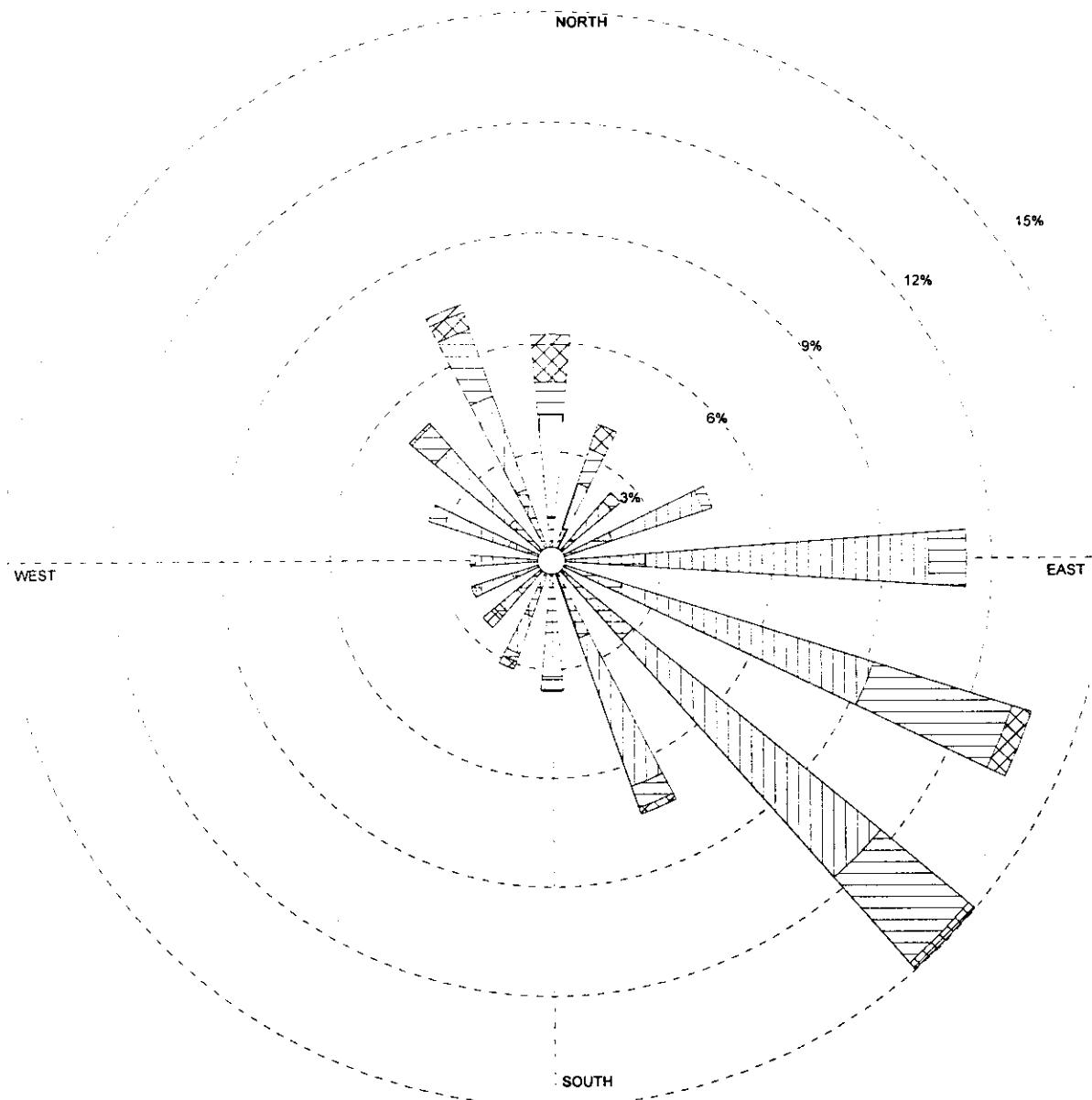
	A	B	C	D	E	F	Total
N	0.001832	0.006410	0.007326	0.020147	0.007784	0.012363	0.055861
NNE	0.001374	0.001374	0.002747	0.010989	0.007784	0.007784	0.032051
NE	0.001832	0.003663	0.002289	0.006868	0.005952	0.010531	0.031136
ENE	0.001374	0.005952	0.008242	0.010073	0.004579	0.015568	0.045788
E	0.003205	0.012821	0.016941	0.011447	0.010073	0.009615	0.064103
ESE	0.000916	0.011447	0.026099	0.029762	0.008242	0.011447	0.087912
SE	0.002747	0.008242	0.026099	0.061813	0.014652	0.015568	0.129121
SSE	0.002747	0.004579	0.012821	0.045330	0.010989	0.005495	0.081960
S	0.001374	0.007784	0.010073	0.028388	0.002747	0.004121	0.054487
SSW	0.000916	0.004121	0.010989	0.016941	0.002747	0.001832	0.037546
SW	0.002289	0.003663	0.010073	0.012363	0.000916	0.003205	0.032509
WSW	0.002289	0.001374	0.005037	0.003205	0.004579	0.003205	0.019689
W	0.001374	0.004121	0.006868	0.007784	0.005952	0.005495	0.031593
WNW	0.000916	0.007784	0.008700	0.019231	0.007784	0.006868	0.051282
NW	0.003205	0.005952	0.012363	0.046703	0.015568	0.003663	0.087454
NNW	0.003663	0.007784	0.011905	0.070055	0.016484	0.010531	0.120421
Total	0.032051	0.097070	0.178571	0.401099	0.126832	0.127289	

Frequency of Calm Winds : 3.71%

Average Wind Speed : 3.62 m/s

WIND ROSE PLOT

Maxwell Station



Wind Speed (m/s)	MODELER	DATE	COMPANY NAME
> 10.8	DISPLAY	5/17/2001	
8.8-10.8	Wind Speed	m/s	
5.7- 8.8	Avg Wind Speed	CALM WINDS	
3.6- 5.7	2.68 m/s	5.39%	
2.1- 3.6			
0.5- 2.1	ORIENTATION Direction (blowing from)	PLOT YEAR-DATE-TIME 96 July 1 - September 30 Midnight - 11 PM	PROJECT/PLOT NO. 3Q 1996

Station ID : 0
Years : 1996
Start Date : July 1
Start Time : Midnight

RUN ID :
End Date : September 30
End Time : 11 PM

Frequency Distribution
(Count)

Wind Direction (Blowing From) / Wind Speed (m/s)

	0.51-2.06	2.06-3.60	3.60-5.66	5.66-8.75	8.75-10.80	>10.80	Total
N	27	62	20	23	6	0	138
NNE	21	29	22	16	0	0	88
NE	18	30	7	0	0	0	55
ENE	39	57	6	0	0	0	102
E	57	170	23	0	0	0	250
ESE	45	158	88	12	0	0	303
SE	64	193	69	5	0	0	331
SSE	50	96	14	4	0	0	164
S	44	27	8	1	0	0	80
SSW	36	24	5	5	0	0	70
SW	27	14	4	9	0	0	54
WSW	25	21	3	2	0	0	51
W	26	20	3	0	0	0	49
WNW	27	41	10	0	0	0	78
NW	33	58	18	2	0	0	111
NNW	46	60	43	11	5	0	165
Total	585	1060	343	90	11	0	

Frequency of Calm Winds : 119

Average Wind Speed : 2.68 m/s

Station ID : 0
 Years : 1996
 Start Date : July 1
 Start Time : Midnight
 RUN ID :
 End Date : September 30
 End Time : 11 PM

Frequency Distribution
 (Normalized)

Wind Direction (Blowing From) / Wind Speed (m/s)

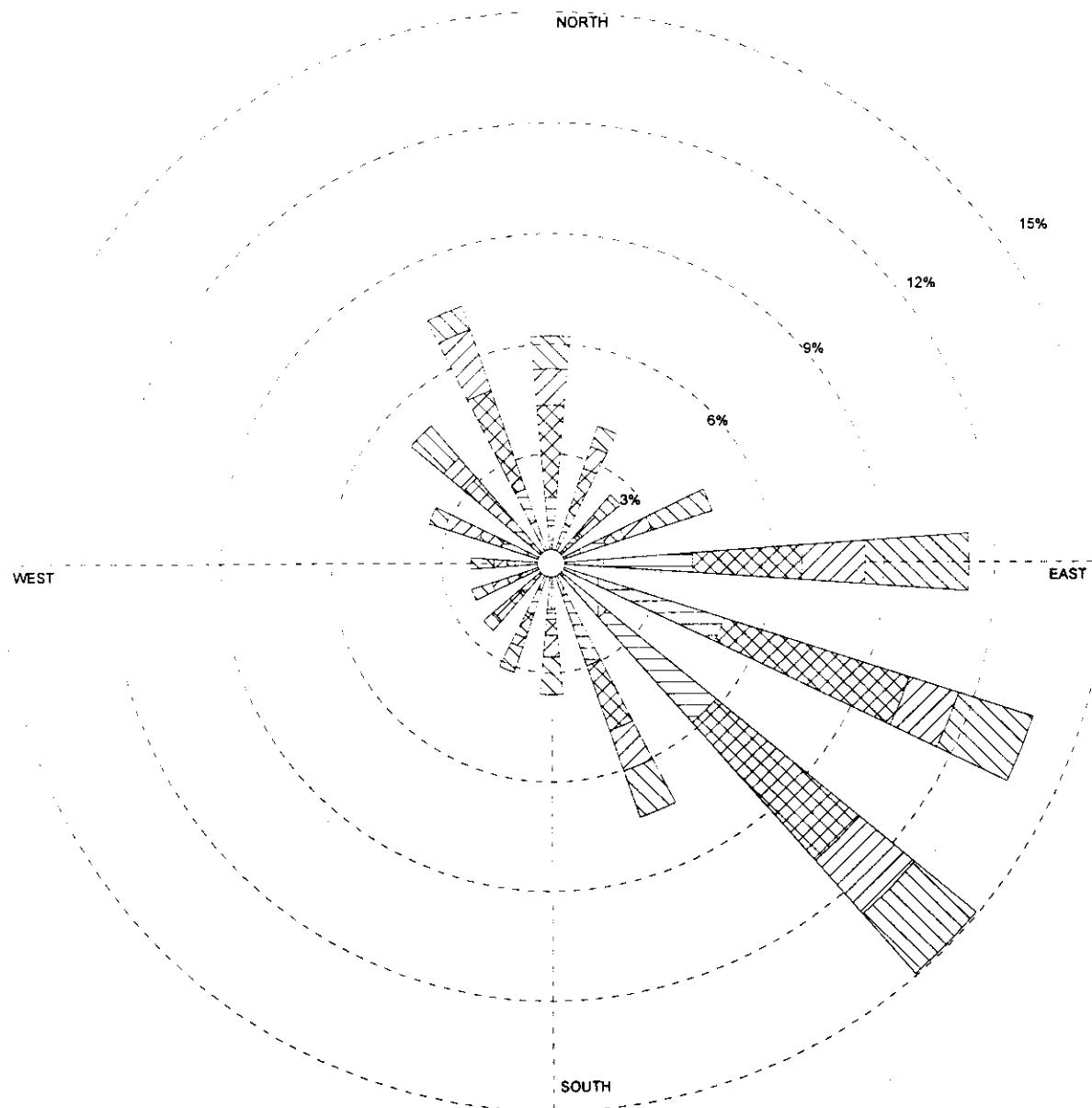
	0.51-2.06	2.06-3.60	3.60-5.66	5.66-8.75	8.75-10.80	>10.80	Total
N	0.012228	0.028080	0.009058	0.010417	0.002717	0.000000	0.062500
NNE	0.009511	0.013134	0.009964	0.007246	0.000000	0.000000	0.039855
NE	0.008152	0.013587	0.003170	0.000000	0.000000	0.000000	0.024909
ENE	0.017663	0.025815	0.002717	0.000000	0.000000	0.000000	0.046196
E	0.025815	0.076993	0.010417	0.000000	0.000000	0.000000	0.113225
ESE	0.020380	0.071558	0.039855	0.005435	0.000000	0.000000	0.137228
SE	0.028986	0.087409	0.031250	0.002264	0.000000	0.000000	0.149909
SSE	0.022645	0.043478	0.006341	0.001812	0.000000	0.000000	0.074275
S	0.019928	0.012228	0.003623	0.000453	0.000000	0.000000	0.036232
SSW	0.016304	0.010870	0.002264	0.002264	0.000000	0.000000	0.031703
SW	0.012228	0.006341	0.001812	0.004076	0.000000	0.000000	0.024457
WSW	0.011322	0.009511	0.001359	0.000906	0.000000	0.000000	0.023098
W	0.011775	0.009058	0.001359	0.000000	0.000000	0.000000	0.022192
WNW	0.012228	0.018569	0.004529	0.000000	0.000000	0.000000	0.035326
NW	0.014946	0.026268	0.008152	0.000906	0.000000	0.000000	0.050272
NNW	0.020833	0.027174	0.019475	0.004982	0.002264	0.000000	0.074728
Total	0.264946	0.480072	0.155344	0.040761	0.004982	0.000000	

Frequency of Calm Winds : 5.39%

Average Wind Speed : 2.68 m/s

WIND ROSE PLOT

Maxwell Station



MODELER		DATE	COMPANY NAME
Stability Class		5/17/2001	
F	DISPLAY	UNIT	COMMENTS
E	Stability Classes	N/A	
D	AVG. WIND SPEED	CALM WINDS	
C	2.68 m/s	5.39%	
B	ORIENTATION	PLOT YEAR-DATE-TIME	PROJECT/PLOT NO.
A	Direction (blowing from)	96 July 1 - September 30 Midnight - 11 PM	3Q 1996

Station ID : 0
Years : 1996
Start Date : July 1
Start Time : Midnight

RUN ID :
End Date : September 30
End Time : 11 PM

Frequency Distribution
(Count)

Wind Direction (Blowing From) / Stability Classes

	A	B	C	D	E	F	Total
N	8	15	17	56	22	20	138
NNE	7	6	12	36	14	13	88
NE	3	10	8	4	14	16	55
ENE	10	9	16	12	17	38	102
E	7	25	53	65	38	62	250
ESE	6	29	74	116	31	47	303
SE	8	36	85	111	43	48	331
SSE	6	15	45	42	26	30	164
S	8	20	6	10	13	23	80
SSW	3	14	16	15	6	16	70
SW	5	9	10	9	13	8	54
WSW	6	6	4	12	10	13	51
W	4	9	9	5	8	14	49
WNW	4	12	16	14	22	10	78
NW	6	10	20	33	16	26	111
NNW	7	20	21	63	39	15	165
Total	98	245	412	603	332	399	

Frequency of Calm Winds : 119
Average Wind Speed : 2.68 m/s

Station ID : 0
 Years : 1996
 Start Date : July 1
 Start Time : Midnight
 RUN ID :
 End Date : September 30
 End Time : 11 PM

Frequency Distribution
 (Normalized)

Wind Direction (Blowing From) / Stability Classes

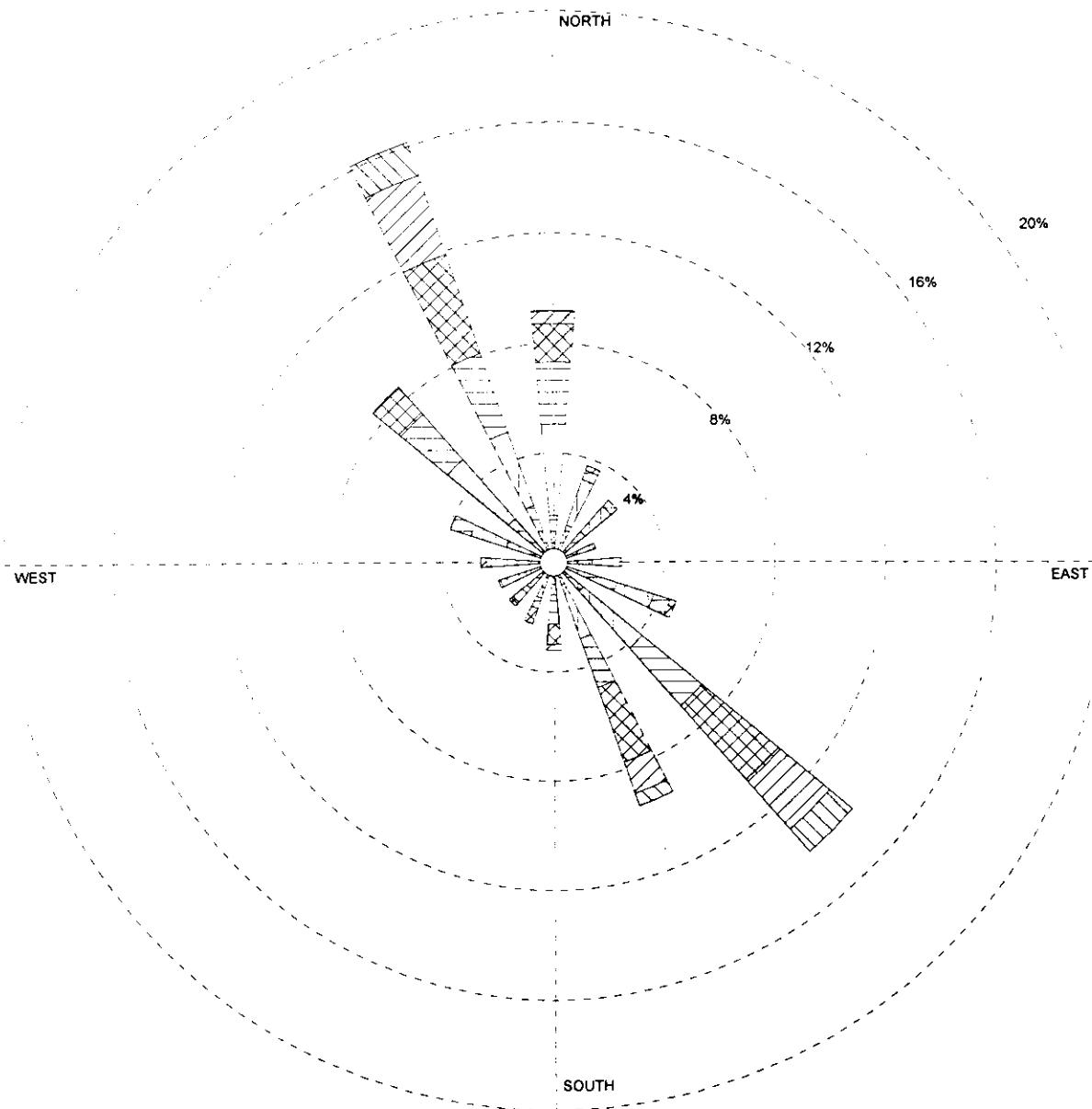
	A	B	C	D	E	F	Total
N	0.003623	0.006793	0.007699	0.025362	0.009964	0.009058	0.062500
NNE	0.003170	0.002717	0.005435	0.016304	0.006341	0.005888	0.039855
NE	0.001359	0.004529	0.003623	0.001812	0.006341	0.007246	0.024909
ENE	0.004529	0.004076	0.007246	0.005435	0.007699	0.017210	0.046196
E	0.003170	0.011322	0.024004	0.029438	0.017210	0.028080	0.113225
ESE	0.002717	0.013134	0.033514	0.052536	0.014040	0.021286	0.137228
SE	0.003623	0.016304	0.038496	0.050272	0.019475	0.021739	0.149909
SSE	0.002717	0.006793	0.020380	0.019022	0.011775	0.013587	0.074275
S	0.003623	0.009058	0.002717	0.004529	0.005888	0.010417	0.036232
SSW	0.001359	0.006341	0.007246	0.006793	0.002717	0.007246	0.031703
SW	0.002264	0.004076	0.004529	0.004076	0.005888	0.003623	0.024457
WSW	0.002717	0.002717	0.001812	0.005435	0.004529	0.005888	0.023098
W	0.001812	0.004076	0.004076	0.002264	0.003623	0.006341	0.022192
WNW	0.001812	0.005435	0.007246	0.006341	0.009964	0.004529	0.035326
NW	0.002717	0.004529	0.009058	0.014946	0.007246	0.011775	0.050272
NNW	0.003170	0.009058	0.009511	0.028533	0.017663	0.006793	0.074728
Total	0.044384	0.110960	0.186594	0.273098	0.150362	0.180707	

Frequency of Calm Winds : 5.39%

Average Wind Speed : 2.68 m/s

WIND ROSE PLOT

Maxwell Station



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	5/17/2001	
> 10.8		
8.8-10.8		
5.7- 8.8		
3.6- 5.7		
2.1- 3.6		
0.5- 2.1		
DISPLAY	UNIT	COMMENTS
Wind Speed	m/s	
AVG. WIND SPEED	CALM WINDS	
4.20 m/s	10.28%	
ORIENTATION	PLOT YEAR-DATE-TIME	PROJECT/PLOT NO.
Direction (blowing from)	96 October 1 - December 31 Midnight - 11 PM	4Q 1996

Station ID : 0
Years : 1996
Start Date : October 1
Start Time : Midnight

RUN ID :
End Date : December 31
End Time : 11 PM

Frequency Distribution
(Count)

Wind Direction (Blowing From) / Wind Speed (m/s)

	0.51-2.06	2.06-3.60	3.60-5.66	5.66-8.75	8.75-10.80	>10.80	Total
N	38	74	50	31	10	1	204
NNE	32	39	8	4	0	0	83
NE	33	27	7	0	0	0	67
ENE	20	14	2	0	0	0	36
E	31	22	2	0	0	0	55
ESE	53	31	14	5	0	0	103
SE	31	61	62	82	51	24	311
SSE	19	46	42	64	27	11	209
S	18	9	23	17	5	0	72
SSW	22	9	9	13	0	0	53
SW	28	5	10	4	0	0	47
WSW	24	16	5	2	0	0	47
W	30	20	4	5	0	0	59
WNW	40	30	17	0	1	0	88
NW	47	64	48	29	1	0	189
NNW	49	63	67	84	67	28	358
Total	515	530	370	340	162	64	

Frequency of Calm Winds : 227

Average Wind Speed : 4.20 m/s

Station ID : 0
Years : 1996
Start Date : October 1
Start Time : Midnight

RUN ID :
End Date : December 31
End Time : 11 PM

Frequency Distribution
(Normalized)

Wind Direction (Blowing From) / Wind Speed (m/s)

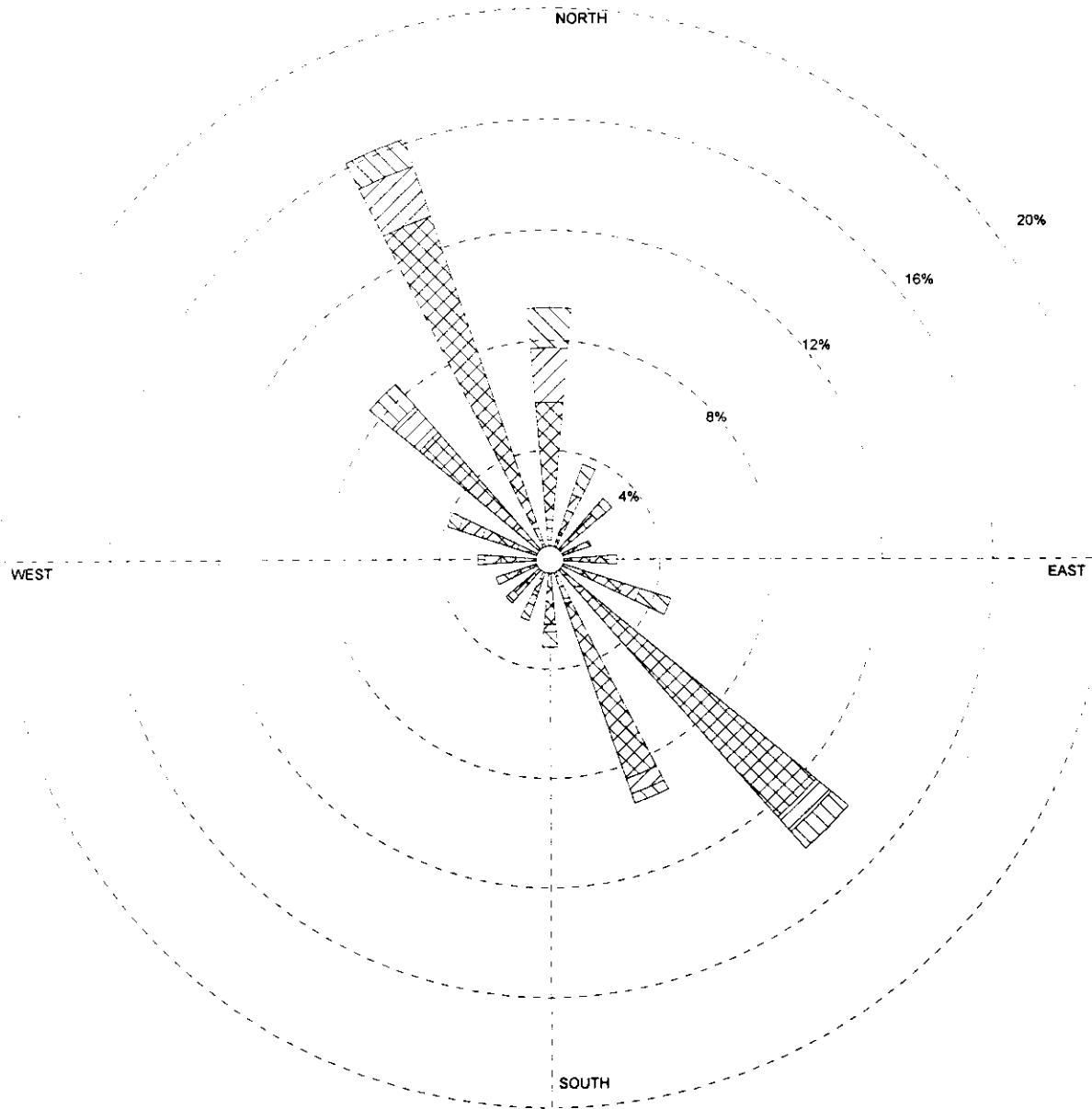
	0 51-2.06	2.06-3.60	3.60-5.66	5.66-8.75	8.75-10.80	>10.80	Total
N	0.017210	0.033514	0.022645	0.014040	0.004529	0.000453	0.092391
NNE	0.014493	0.017663	0.003623	0.001812	0.000000	0.000000	0.037591
NE	0.014946	0.012228	0.003170	0.000000	0.000000	0.000000	0.030344
ENE	0.009058	0.006341	0.000906	0.000000	0.000000	0.000000	0.016304
E	0.014040	0.009964	0.000906	0.000000	0.000000	0.000000	0.024909
ESE	0.024004	0.014040	0.006341	0.002264	0.000000	0.000000	0.046649
SE	0.014040	0.027627	0.028080	0.037138	0.023098	0.010870	0.140851
SSE	0.008605	0.020833	0.019022	0.028986	0.012228	0.004982	0.094656
S	0.008152	0.004076	0.010417	0.007699	0.002264	0.000000	0.032609
SSW	0.009964	0.004076	0.004076	0.005888	0.000000	0.000000	0.024004
SW	0.012681	0.002264	0.004529	0.001812	0.000000	0.000000	0.021286
WSW	0.010870	0.007246	0.002264	0.000906	0.000000	0.000000	0.021286
W	0.013587	0.009058	0.001812	0.002264	0.000000	0.000000	0.026721
WNW	0.018116	0.013587	0.007699	0.000000	0.000453	0.000000	0.039855
NW	0.021286	0.028986	0.021739	0.013134	0.000453	0.000000	0.085598
NNW	0.022192	0.028533	0.030344	0.038043	0.030344	0.012681	0.162138
Total	0.233243	0.240036	0.167572	0.153986	0.073370	0.028986	

Frequency of Calm Winds : 10.28%

Average Wind Speed : 4.20 m/s

WIND ROSE PLOT

Maxwell Station



STABILITY CLASS	MODELER	DATE	COMPANY NAME
F		5/17/2001	
E	DISPLAY	UNIT	COMMENTS
D	STABILITY CLASSES	N/A	
C	Avg. Wind Speed	CALM WINDS	
B	4.20 m/s	10.28%	
A	ORIENTATION Direction (blowing from)	PLOT YEAR-DATE-TIME 96 October 1 - December 31 Midnight - 11 PM	PROJECT/PLOT NO. 4Q 1996

Station ID : 0
Years : 1996
Start Date : October 1
Start Time : Midnight

RUN ID :
End Date : December 31
End Time : 11 PM

Frequency Distribution
(Count)

Wind Direction (Blowing From) / Stability Classes

	A	B	C	D	E	F	Total
N	5	7	21	95	44	32	204
NNE	7	9	6	21	14	26	83
NE	3	11	8	18	11	16	67
ENE	2	6	9	4	4	11	36
E	0	6	9	18	9	13	55
ESE	4	6	18	35	14	26	103
SE	3	7	27	240	16	18	311
SSE	2	13	23	150	13	8	209
S	2	3	5	43	6	13	72
SSW	3	2	7	20	8	13	53
SW	1	3	13	10	12	8	47
WSW	3	5	5	13	10	11	47
W	3	9	16	12	13	6	59
WNW	2	7	19	30	20	10	88
NW	3	9	24	101	28	24	189
NNW	3	11	19	260	42	23	358
Total	46	114	229	1070	264	258	

Frequency of Calm Winds : 227

Average Wind Speed : 4.20 m/s

Station ID : 0
 Years : 1996
 Start Date : October 1
 Start Time : Midnight
 RUN ID :
 End Date : December 31
 End Time : 11 PM

Frequency Distribution
(Normalized)

Wind Direction (Blowing From) / Stability Classes

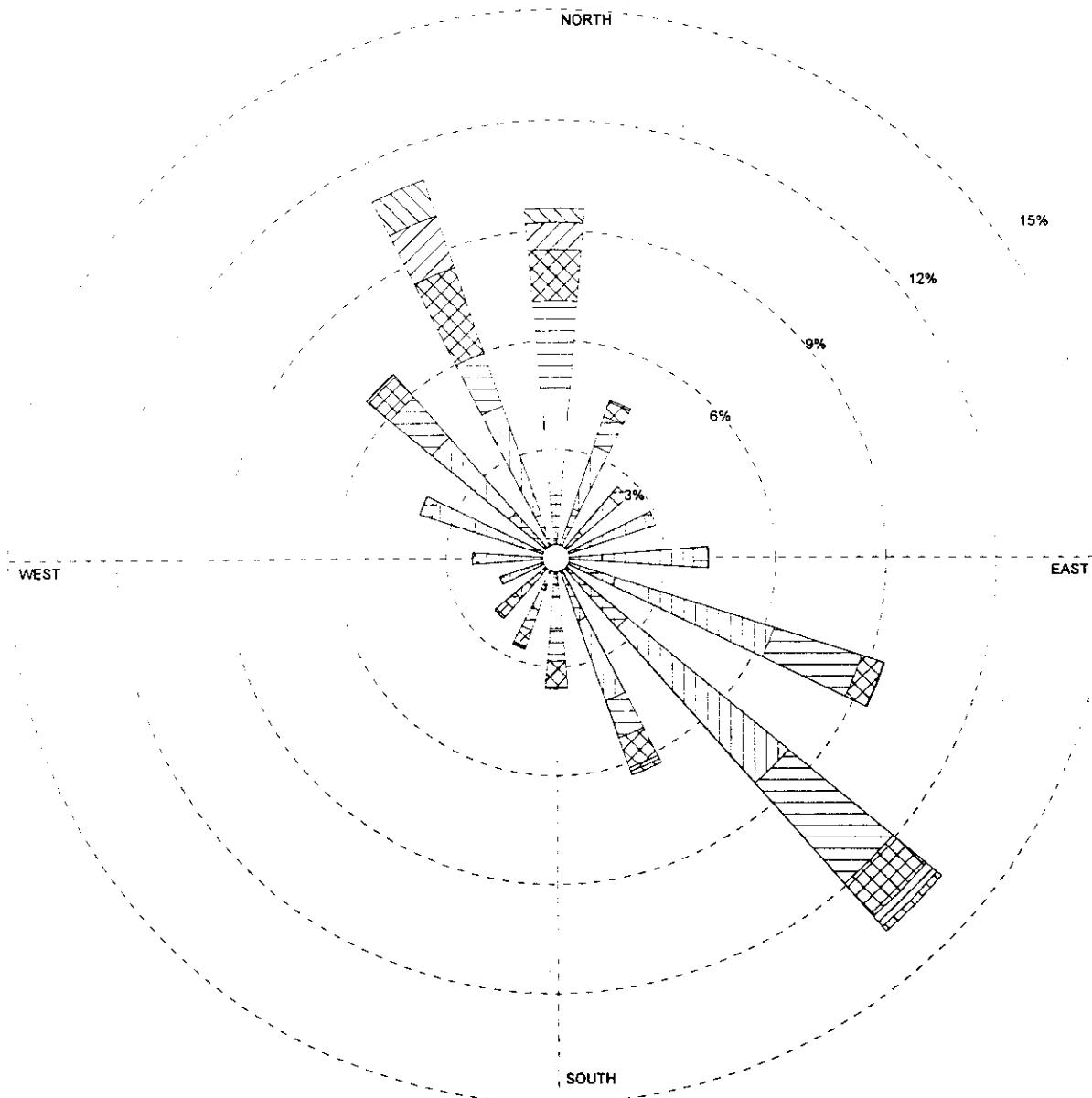
	A	B	C	D	E	F	Total
N	0.002264	0.003170	0.009511	0.043025	0.019928	0.014493	0.092391
NNNE	0.003170	0.004076	0.002717	0.009511	0.006341	0.011775	0.037591
NE	0.001359	0.004982	0.003623	0.008152	0.004982	0.007246	0.030344
ENE	0.000906	0.002717	0.004076	0.001812	0.001812	0.004982	0.016304
E	0.000000	0.002717	0.004076	0.008152	0.004076	0.005888	0.024909
ESE	0.001812	0.002717	0.008152	0.015851	0.006341	0.011775	0.046649
SE	0.001359	0.003170	0.012228	0.108696	0.007246	0.008152	0.140851
SSE	0.000906	0.005888	0.010417	0.067935	0.005888	0.003623	0.094656
S	0.000906	0.001359	0.002264	0.019475	0.002717	0.005888	0.032609
SSW	0.001359	0.000906	0.003170	0.009058	0.003623	0.005888	0.024004
SW	0.000453	0.001359	0.005888	0.004529	0.005435	0.003623	0.021286
WSW	0.001359	0.002264	0.002264	0.005888	0.004529	0.004982	0.021286
W	0.001359	0.004076	0.007246	0.005435	0.005888	0.002717	0.026721
WNW	0.000906	0.003170	0.008605	0.013587	0.009058	0.004529	0.039855
NW	0.001359	0.004076	0.010870	0.045743	0.012681	0.010870	0.085598
NNW	0.001359	0.004982	0.008605	0.117754	0.019022	0.010417	0.162138
Total	0.020833	0.051630	0.103714	0.484601	0.119565	0.116848	

Frequency of Calm Winds : 10.28%

Average Wind Speed : 4.20 m/s

WIND ROSE PLOT

Maxwell Station



Wind Speed (m/s)	MODELER	DATE	COMPANY NAME
> 10.8	5/17/2001		
8.8-10.8	DISPLAY	UNIT	COMMENTS
5.7- 8.8	Wind Speed	m/s	
3.6- 5.7	AVG. WIND SPEED	CALM WINDS	
2.1- 3.6	3.51 m/s	12.15%	
0.5- 2.1	ORIENTATION Direction (blowing from)	PLOT YEAR-DATE-TIME 99 January 1 - December 31 Midnight - 11 PM	PROJECT/PLOT NO. annual 1999

Station ID : 0
Years : 1999
Start Date : January 1
Start Time : Midnight

RUN ID :
End Date : December 31
End Time : 11 PM

Frequency Distribution
(Count)

Wind Direction (Blowing From) / Wind Speed (m/s)

	0.51-2.06	2.06-3.60	3.60-5.66	5.66-8.75	8.75-10.80	>10.80	Total
N	153	259	209	123	66	34	844
NNE	127	159	75	37	6	0	404
NE	85	114	31	1	0	0	231
ENE	87	148	21	0	0	0	256
E	111	221	33	5	0	0	370
ESE	152	398	219	56	3	0	828
SE	224	500	322	104	34	15	1199
SSE	159	206	97	77	10	10	559
S	95	76	79	64	5	0	319
SSW	82	51	52	43	4	3	235
SW	89	41	29	35	1	0	195
WSW	72	56	6	11	0	0	145
W	99	86	9	8	2	0	204
WNW	110	204	30	2	0	0	346
NW	147	241	131	67	8	1	595
NNW	111	278	136	218	132	91	966
Total	1903	3038	1479	851	271	154	

Frequency of Calm Winds : 1064

Average Wind Speed : 3.51 m/s

Station ID : 0

RUN ID :

Years : 1999

Start Date : January 1

End Date : December 31

Start Time : Midnight

End Time : 11 PM

Frequency Distribution
(Normalized)

Wind Direction (Blowing From) / Wind Speed (m/s)

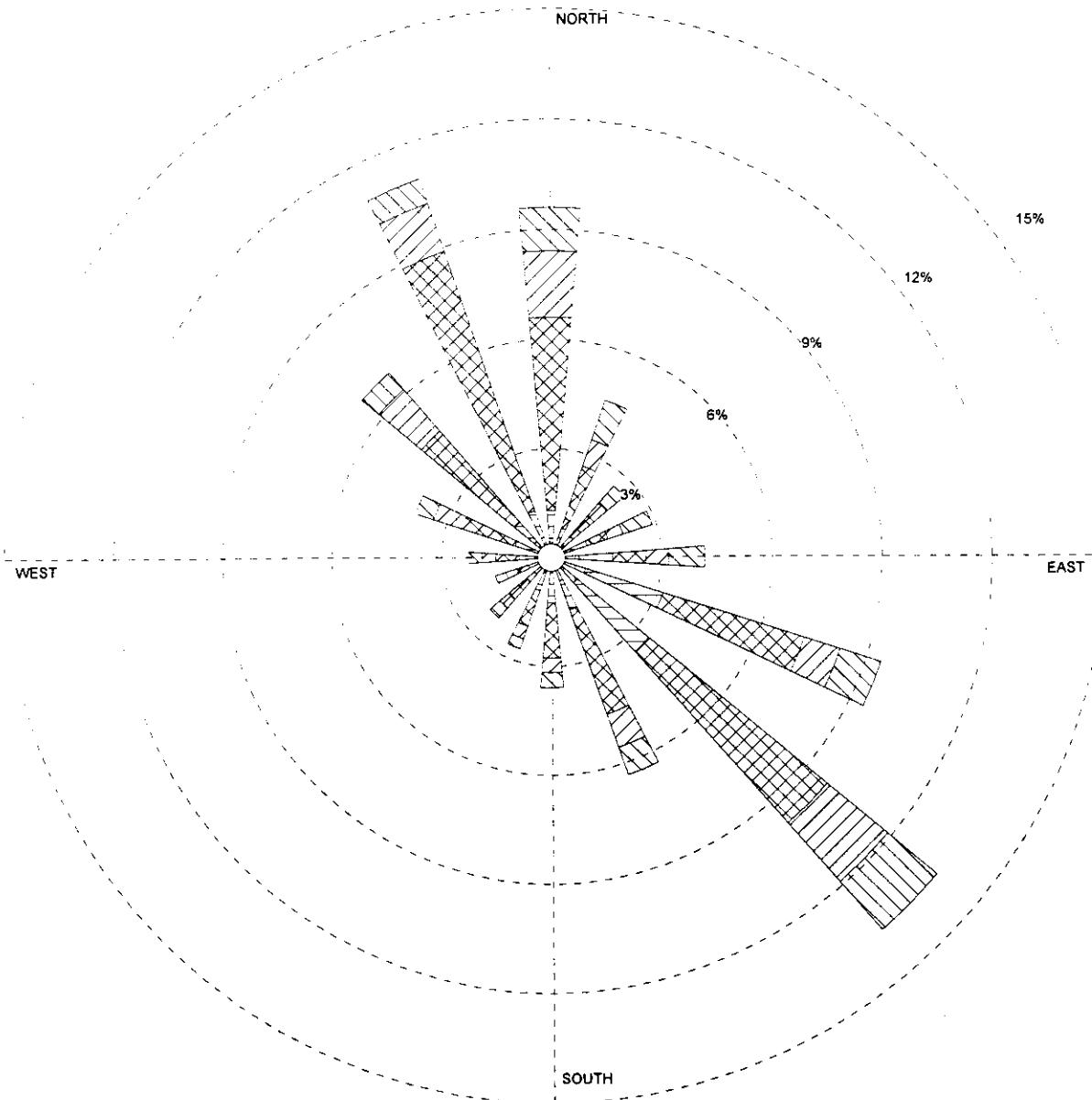
	0.51-2.06	2.06-3.60	3.60-5.66	5.66-8.75	8.75-10.80	>10.80	Total
N	0.017466	0.029566	0.023858	0.014041	0.007534	0.003881	0.096347
NNE	0.014498	0.018151	0.008562	0.004224	0.000685	0.000000	0.046119
NE	0.009703	0.013014	0.003539	0.000114	0.000000	0.000000	0.026370
ENE	0.009932	0.016895	0.002397	0.000000	0.000000	0.000000	0.029224
E	0.012671	0.025228	0.003767	0.000571	0.000000	0.000000	0.042237
ESE	0.017352	0.045434	0.025000	0.006393	0.000342	0.000000	0.094521
SE	0.025571	0.057078	0.036758	0.011872	0.003881	0.001712	0.136872
SSE	0.018151	0.023516	0.011073	0.008790	0.001142	0.001142	0.063813
S	0.010845	0.008676	0.009018	0.007306	0.000571	0.000000	0.036416
SSW	0.009361	0.005822	0.005936	0.004909	0.000457	0.000342	0.026826
SW	0.010160	0.004680	0.003311	0.003995	0.000114	0.000000	0.022260
WSW	0.008219	0.006393	0.000685	0.001256	0.000000	0.000000	0.016553
W	0.011301	0.009817	0.001027	0.000913	0.000228	0.000000	0.023288
WNW	0.012557	0.023288	0.003425	0.000228	0.000000	0.000000	0.039498
NW	0.016781	0.027511	0.014954	0.007648	0.000913	0.000114	0.067922
NNW	0.012671	0.031735	0.015525	0.024886	0.015068	0.010388	0.110274
Total	0.217237	0.346804	0.168836	0.097146	0.030936	0.017580	

Frequency of Calm Winds : 12.15%

Average Wind Speed : 3.51 m/s

WIND ROSE PLOT

Maxwell Station



STABILITY CLASS	MODELER	DATE	COMPANY NAME
F	DISPLAY	5/17/2001	
E	STABILITY CLASSES	N/A	
D	Avg. Wind Speed	CALM WINDS	
C	3.51 m/s	12.15%	
B	Orientation	PLOT YEAR-DATE-TIME	PROJECT/PLOT NO.
A	Direction (blowing from)	99 January 1 - December 31 Midnight - 11 PM	annual 1999

Station ID : 0
Years : 1999
Start Date : January 1
Start Time : Midnight

RUN ID :
End Date : December 31
End Time : 11 PM

Frequency Distribution
(Count)

Wind Direction (Blowing From) / Stability Classes

	A	B	C	D	E	F	Total
N	15	32	69	465	159	104	844
NNE	5	31	42	158	68	100	404
NE	15	25	29	65	42	55	231
ENE	10	31	50	53	39	73	256
E	23	45	80	81	53	88	370
ESE	14	73	194	354	90	103	828
SE	15	66	221	553	189	155	1199
SSE	18	43	74	269	85	70	559
S	6	29	76	134	36	38	319
SSW	9	27	50	91	32	26	235
SW	9	25	44	57	28	32	195
WSW	6	19	33	30	30	27	145
W	7	34	38	57	34	34	204
WNW	12	21	60	136	70	47	346
NW	18	35	63	292	134	53	595
NNW	14	39	69	659	122	63	966
Total	196	575	1192	3454	1211	1068	

Frequency of Calm Winds : 1064

Average Wind Speed : 3.51 m/s

Station ID : 0
Years : 1999
Start Date : January 1
Start Time : Midnight

RUN ID :
End Date : December 31
End Time : 11 PM

Frequency Distribution
(Normalized)

Wind Direction (Blowing From) / Stability Classes

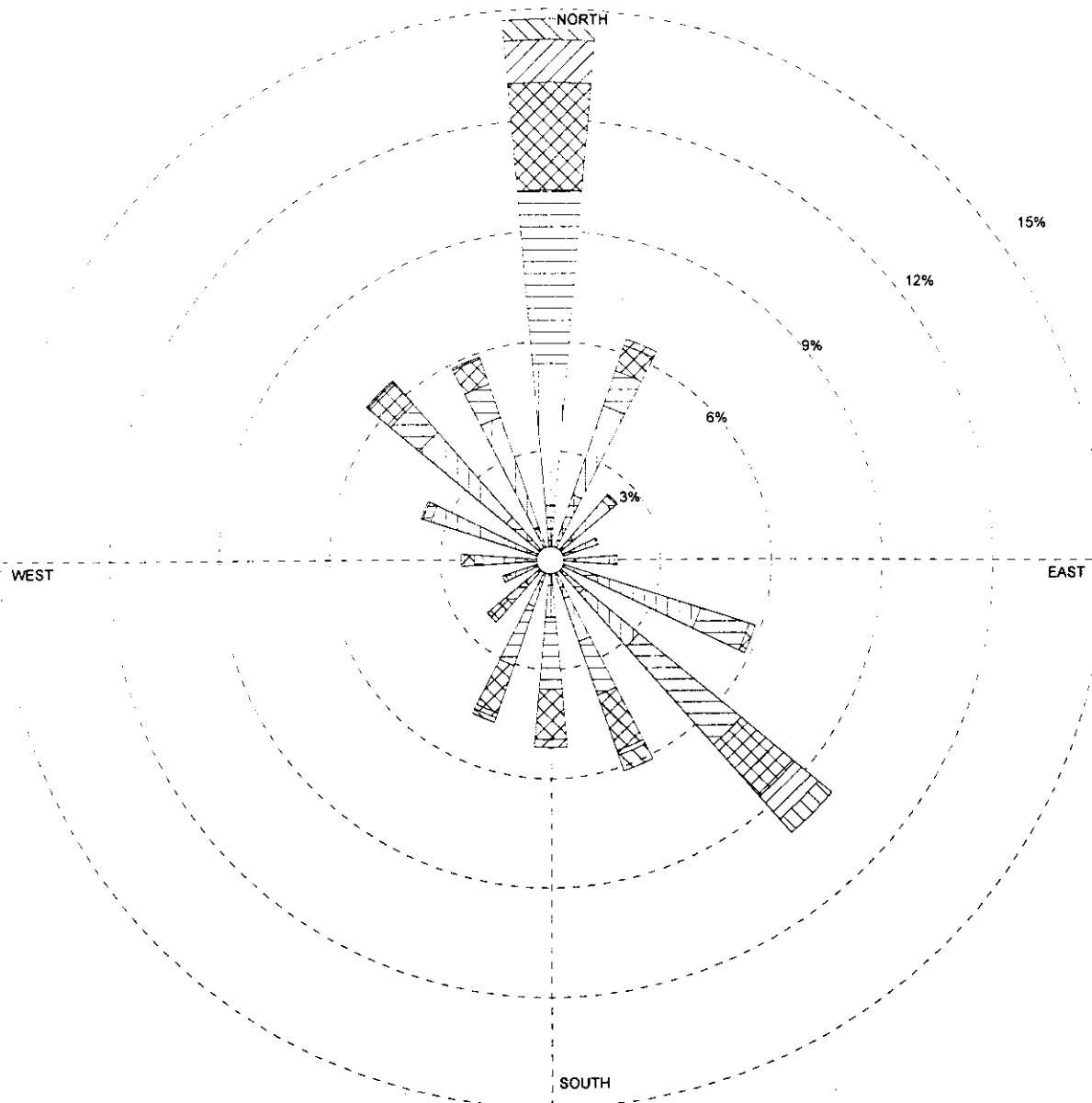
	A	B	C	D	E	F	Total
N	0.001712	0.003653	0.007877	0.053082	0.018151	0.011872	0.096347
NNE	0.000571	0.003539	0.004795	0.018037	0.007763	0.011416	0.046119
NE	0.001712	0.002854	0.003311	0.007420	0.004795	0.006279	0.026370
ENE	0.001142	0.003539	0.005708	0.006050	0.004452	0.008333	0.029224
E	0.002626	0.005137	0.009132	0.009247	0.006050	0.010046	0.042237
ESE	0.001598	0.008333	0.022146	0.040411	0.010274	0.011758	0.094521
SE	0.001712	0.007534	0.025228	0.063128	0.021575	0.017694	0.136872
SSE	0.002055	0.004909	0.008447	0.030708	0.009703	0.007991	0.063813
S	0.000685	0.003311	0.008676	0.015297	0.004110	0.004338	0.036416
SSW	0.001027	0.003082	0.005708	0.010388	0.003653	0.002968	0.026826
SW	0.001027	0.002854	0.005023	0.006507	0.003196	0.003653	0.022260
WSW	0.000685	0.002169	0.003767	0.003425	0.003425	0.003082	0.016553
W	0.000799	0.003881	0.004338	0.006507	0.003881	0.003881	0.023288
WNW	0.001370	0.002397	0.006849	0.015525	0.007991	0.005365	0.039498
NW	0.002055	0.003995	0.007192	0.033333	0.015297	0.006050	0.067922
NNW	0.001598	0.004452	0.007877	0.075228	0.013927	0.007192	0.110274
Total	0.022374	0.065639	0.136073	0.394292	0.138242	0.121918	

Frequency of Calm Winds : 12.15%

Average Wind Speed : 3.51 m/s

WIND ROSE PLOT

Maxwell Station



Wind Speed (m/s)	MODELER	DATE	COMPANY NAME
> 10.8		5/17/2001	
8.8-10.8	DISPLAY	UNIT	COMMENTS
5.7-8.8	Wind Speed	m/s	
3.6-5.7	Avg Wind Speed	CALM WINDS	
2.1-3.6	3.88 m/s	18.89%	
0.5-2.1	ORIENTATION	PLOT YEAR-DATE-TIME	PROJECT/PLOT NO.
	Direction (blowing from)	99	
		January 1 - March 31	1Q 1999
		Midnight - 11 PM	

Station ID : 0
Years : 1999
Start Date : January 1
Start Time : Midnight

RUN ID :
End Date : March 31
End Time : 11 PM

Frequency Distribution
(Count)

Wind Direction (Blowing From) / Wind Speed (m/s)

	0.51-2.06	2.06-3.60	3.60-5.66	5.66-8.75	8.75-10.80	>10.80	Total
N	33	84	102	63	25	12	319
NNE	41	56	22	16	4	0	139
NE	18	29	4	1	0	0	52
ENE	14	15	1	0	0	0	30
E	15	23	2	0	0	0	40
ESE	29	64	30	4	0	0	127
SE	26	42	78	41	18	11	216
SSE	24	27	34	35	3	10	133
S	15	19	43	30	5	0	112
SSW	14	15	37	30	3	3	102
SW	10	10	15	14	0	0	49
WSW	10	15	3	2	0	0	30
W	15	25	5	6	2	0	53
WNW	27	47	5	1	0	0	80
NW	34	67	22	18	0	1	142
NNW	21	69	21	16	1	0	128
Total	346	607	424	277	61	37	

Frequency of Calm Winds : 408

Average Wind Speed : 3.88 m/s

Station ID : 0
Years : 1999
Start Date : January 1
Start Time : Midnight

RUN ID :
End Date : March 31
End Time : 11 PM

Frequency Distribution
(Normalized)

Wind Direction (Blowing From) / Wind Speed (m/s)

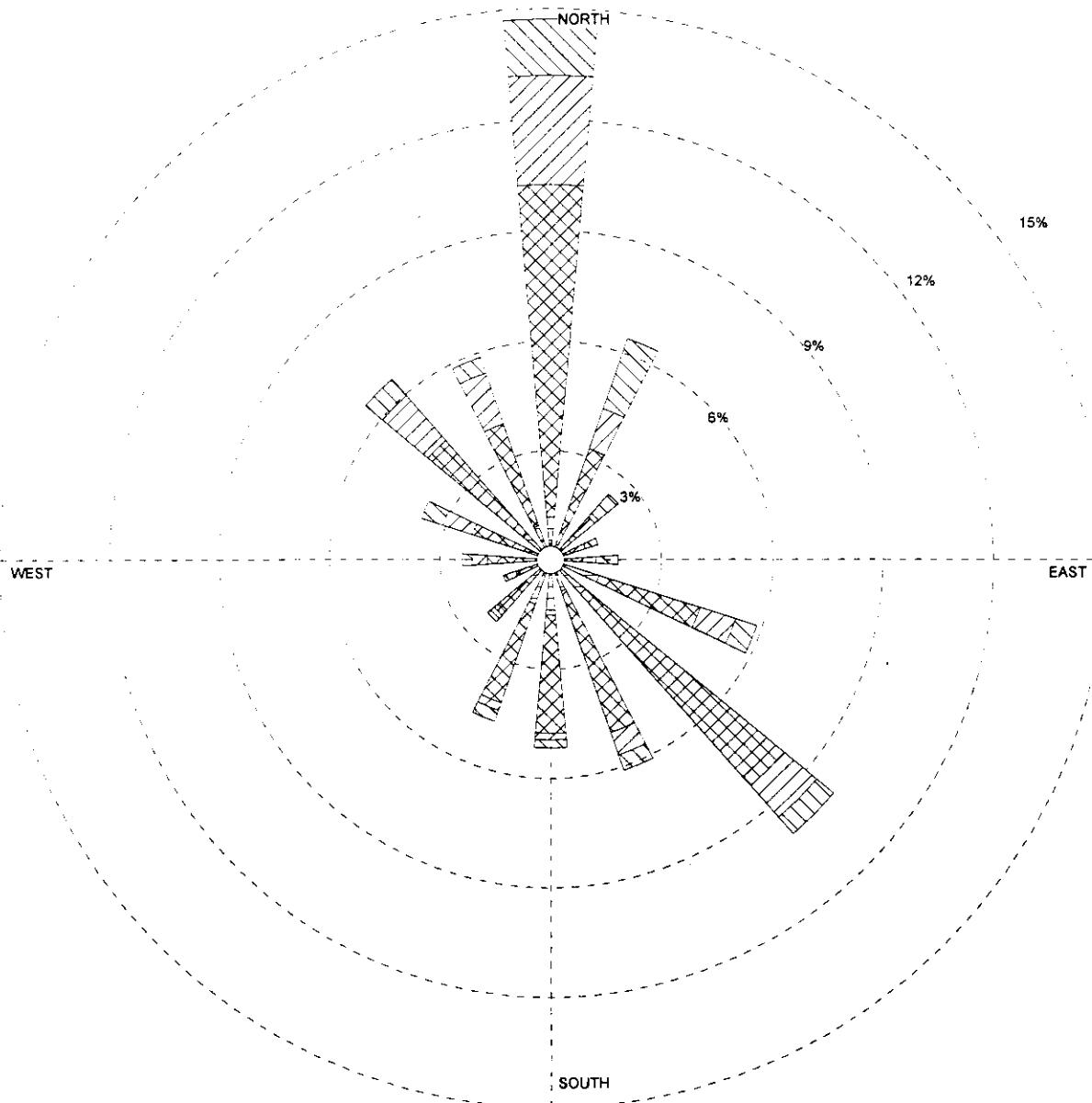
	0.51-2.06	2.06-3.60	3.60-5.66	5.66-8.75	8.75-10.80	>10.80	Total
N	0.015278	0.038889	0.047222	0.029167	0.011574	0.005556	0.147685
NNE	0.018981	0.025926	0.010185	0.007407	0.001852	0.000000	0.064352
NE	0.008333	0.013426	0.001852	0.000463	0.000000	0.000000	0.024074
ENE	0.006481	0.006944	0.000463	0.000000	0.000000	0.000000	0.013889
E	0.006944	0.010648	0.000926	0.000000	0.000000	0.000000	0.018519
ESE	0.013426	0.029630	0.013889	0.001852	0.000000	0.000000	0.058796
SE	0.012037	0.019444	0.036111	0.018981	0.008333	0.005093	0.100000
SSE	0.011111	0.012500	0.015741	0.016204	0.001389	0.004630	0.061574
S	0.006944	0.008796	0.019907	0.013889	0.002315	0.000000	0.051852
SSW	0.006481	0.006944	0.017130	0.013889	0.001389	0.001389	0.047222
SW	0.004630	0.004630	0.006944	0.006481	0.000000	0.000000	0.022685
WSW	0.004630	0.006944	0.001389	0.000926	0.000000	0.000000	0.013889
W	0.006944	0.011574	0.002315	0.002778	0.000926	0.000000	0.024537
WNW	0.012500	0.021759	0.002315	0.000463	0.000000	0.000000	0.037037
NW	0.015741	0.031019	0.010185	0.008333	0.000000	0.000463	0.065741
NNW	0.009722	0.031944	0.009722	0.007407	0.000463	0.000000	0.059259
Total	0.160185	0.281019	0.196296	0.128241	0.028241	0.017130	

Frequency of Calm Winds : 18.89%

Average Wind Speed : 3.88 m/s

WIND ROSE PLOT

Maxwell Station



Stability Class	MODELER	DATE	COMPANY NAME
F		5/17/2001	
E	DISPLAY	UNIT	COMMENTS
D	Stability Classes	N/A	
C	Avg Wind Speed	CALM WINDS	
B	3.88 m/s	18.89%	
A	ORIENTATION Direction (blowing from)	PLOT YEAR-DATE-TIME 99 January 1 - March 31 Midnight - 11 PM	PROJECT/PLOT NO. 1Q 1999

Station ID : 0
Years : 1999
Start Date : January 1
Start Time : Midnight

RUN ID :
End Date : March 31
End Time : 11 PM

Frequency Distribution
(Count)

Wind Direction (Blowing From) / Stability Classes

	A	B	C	D	E	F	Total
N	2	8	16	196	64	33	319
NNE	0	4	6	60	25	44	139
NE	1	0	3	16	14	18	52
ENE	0	2	1	10	9	8	30
E	0	3	4	12	8	13	40
ESE	1	5	24	62	22	13	127
SE	1	3	23	151	25	13	216
SSE	4	5	11	89	14	10	133
S	1	5	27	70	4	5	112
SSW	2	4	22	62	5	7	102
SW	2	5	12	22	3	5	49
WSW	1	2	9	10	6	2	30
W	1	5	10	22	9	6	53
WNW	0	4	12	33	18	13	80
NW	2	6	13	73	35	13	142
NNW	3	9	10	64	32	10	128
Total	21	70	203	952	293	213	

Frequency of Calm Winds : 408

Average Wind Speed : 3.88 m/s

Station ID : 0
 Years : 1999
 Start Date : January 1
 Start Time : Midnight
 RUN ID :
 End Date : March 31
 End Time : 11 PM

Frequency Distribution
(Normalized)

Wind Direction (Blowing From) / Stability Classes

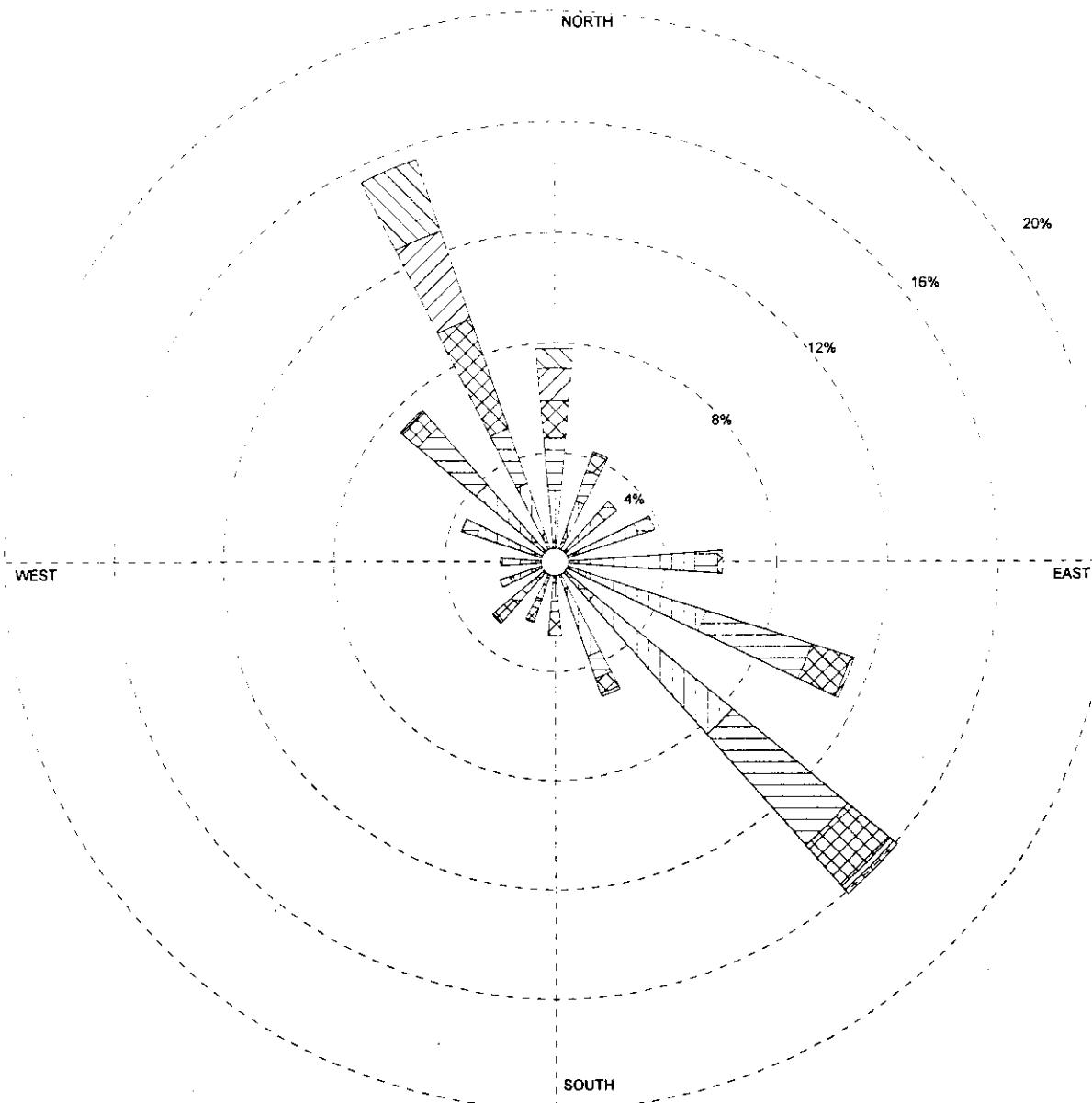
	A	B	C	D	E	F	Total
N	0.000926	0.003704	0.007407	0.090741	0.029630	0.015278	0.147685
NNE	0.000000	0.001852	0.002778	0.027778	0.011574	0.020370	0.064352
NE	0.000463	0.000000	0.001389	0.007407	0.006481	0.008333	0.024074
ENE	0.000000	0.000926	0.000463	0.004630	0.004167	0.003704	0.013889
E	0.000000	0.001389	0.001852	0.005556	0.003704	0.006019	0.018519
ESE	0.000463	0.002315	0.011111	0.028704	0.010185	0.006019	0.058796
SE	0.000463	0.001389	0.010648	0.069907	0.011574	0.006019	0.100000
SSE	0.001852	0.002315	0.005093	0.041204	0.006481	0.004630	0.061574
S	0.000463	0.002315	0.012500	0.032407	0.001852	0.002315	0.051852
SSW	0.000926	0.001852	0.010185	0.028704	0.002315	0.003241	0.047222
SW	0.000926	0.002315	0.005556	0.010185	0.001389	0.002315	0.022685
WSW	0.000463	0.000926	0.004167	0.004630	0.002778	0.000926	0.013889
W	0.000463	0.002315	0.004630	0.010185	0.004167	0.002778	0.024537
WNW	0.000000	0.001852	0.005556	0.015278	0.008333	0.006019	0.037037
NW	0.000926	0.002778	0.006019	0.033796	0.016204	0.006019	0.065741
NNW	0.001389	0.004167	0.004630	0.029630	0.014815	0.004630	0.059259
Total	0.009722	0.032407	0.093981	0.440741	0.135648	0.098611	

Frequency of Calm Winds : 18.89%

Average Wind Speed : 3.88 m/s

WIND ROSE PLOT

Maxwell Station



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	5/17/2001	
DISPLAY	UNIT	COMMENTS
Wind Speed	m/s	
AVG. WIND SPEED	CALM WINDS	
4.18 m/s	3.30%	
ORIENTATION	PLOT YEAR-DATE-TIME	PROJECT/PLOT NO.
Direction (blowing from)	99 April 1 - June 30 Midnight - 11 PM	2Q 1999

Station ID : 0
Years : 1999
Start Date : April 1
Start Time : Midnight

RUN ID :
End Date : June 30
End Time : 11 PM

Frequency Distribution
(Count)

Wind Direction (Blowing From) / Wind Speed (m/s)

	0.51-2.06	2.06-3.60	3.60-5.66	5.66-8.75	8.75-10.80	>10.80	Total
N	17	41	42	30	26	16	172
NNE	20	32	26	14	2	0	94
NE	13	39	13	0	0	0	65
ENE	19	51	14	0	0	0	84
E	19	92	18	4	0	0	133
ESE	27	99	87	33	3	0	249
SE	41	142	118	43	4	4	352
SSE	23	57	19	13	3	0	115
S	17	15	8	20	0	0	60
SSW	20	12	8	11	1	0	52
SW	20	14	11	20	1	0	66
WSW	17	18	3	9	0	0	47
W	15	25	2	2	0	0	44
WNW	18	48	12	1	0	0	79
NW	23	59	60	16	3	0	161
NNW	24	43	46	92	74	60	339
Total	333	787	487	308	117	80	

Frequency of Calm Winds : 72

Average Wind Speed : 4.18 m/s

Station ID : 0
 Years : 1999
 Start Date : April 1
 Start Time : Midnight
 RUN ID :
 End Date : June 30
 End Time : 11 PM

Frequency Distribution
(Normalized)

Wind Direction (Blowing From) / Wind Speed (m/s)

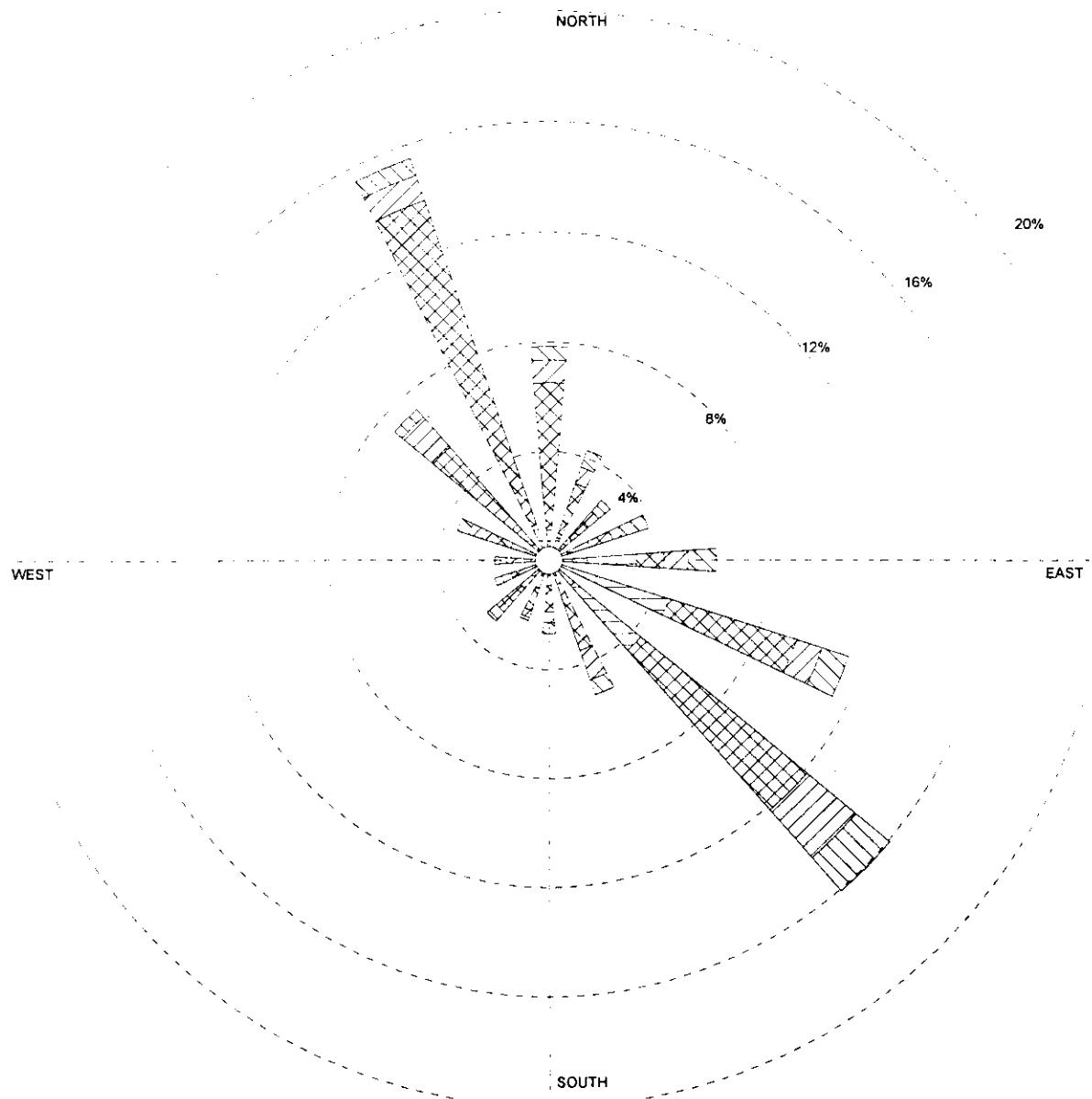
	0.51-2.06	2.06-3.60	3.60-5.66	5.66-8.75	8.75-10.80	>10.80	Total
N	0.007784	0.018773	0.019231	0.013736	0.011905	0.007326	0.078755
NNE	0.009158	0.014652	0.011905	0.006410	0.000916	0.000000	0.043040
NE	0.005952	0.017857	0.005952	0.000000	0.000000	0.000000	0.029762
ENE	0.008700	0.023352	0.006410	0.000000	0.000000	0.000000	0.038462
E	0.008700	0.042125	0.008242	0.001832	0.000000	0.000000	0.060897
ESE	0.012363	0.045330	0.039835	0.015110	0.001374	0.000000	0.114011
SE	0.018773	0.065018	0.054029	0.019689	0.001832	0.001832	0.161172
SSE	0.010531	0.026099	0.008700	0.005952	0.001374	0.000000	0.052656
S	0.007784	0.006868	0.003663	0.009158	0.000000	0.000000	0.027473
SSW	0.009158	0.005495	0.003663	0.005037	0.000458	0.000000	0.023810
SW	0.009158	0.006410	0.005037	0.009158	0.000458	0.000000	0.030220
WSW	0.007784	0.008242	0.001374	0.004121	0.000000	0.000000	0.021520
W	0.006868	0.011447	0.000916	0.000916	0.000000	0.000000	0.020147
WNW	0.008242	0.021978	0.005495	0.000458	0.000000	0.000000	0.036172
NW	0.010531	0.027015	0.027473	0.007326	0.001374	0.000000	0.073718
NNW	0.010989	0.019689	0.021062	0.042125	0.033883	0.027473	0.155220
Total	0.152473	0.360348	0.222985	0.141026	0.053571	0.036630	

Frequency of Calm Winds : 3.30%

Average Wind Speed : 4.18 m/s

WIND ROSE PLOT

Maxwell Station



MODELER		DATE	COMPANY NAME
Stability Class		5/17/2001	
F	DISPLAY	UNIT	COMMENTS
E	Stability Classes	N/A	
D	AVG. WIND SPEED	CALM WINDS	
C	4.18 m/s	3.30%	
B	ORIENTATION	PLOT YEAR-DATE-TIME	PROJECT/PLOT NO
A	Direction (blowing from)	99 April 1 - June 30 Midnight - 11 PM	2Q 1999

Station ID : 0
Years : 1999
Start Date : April 1
Start Time : Midnight

RUN ID :
End Date : June 30
End Time : 11 PM

Frequency Distribution
(Count)

Wind Direction (Blowing From) / Stability Classes

	A	B	C	D	E	F	Total
N	3	7	15	118	18	11	172
NNE	3	5	12	46	14	14	94
NE	6	12	7	17	11	12	65
ENE	5	11	19	19	8	22	84
E	7	24	39	22	19	22	133
ESE	7	36	57	106	21	22	249
SE	7	20	69	170	51	35	352
SSE	3	8	10	56	25	13	115
S	3	6	12	21	9	9	60
SSW	4	8	12	19	6	3	52
SW	2	10	18	20	6	10	66
WSW	3	9	11	10	8	6	47
W	1	14	11	9	4	5	44
WNW	3	10	20	24	12	10	79
NW	6	12	16	87	32	8	161
NNW	2	8	21	273	21	14	339
Total	65	200	349	1017	265	216	

Frequency of Calm Winds : 72
Average Wind Speed : 4.18 m/s

Station ID : 0
Years : 1999
Start Date : April 1
Start Time : Midnight

RUN ID :
End Date : June 30
End Time : 11 PM

Frequency Distribution
(Normalized)

Wind Direction (Blowing From) / Stability Classes

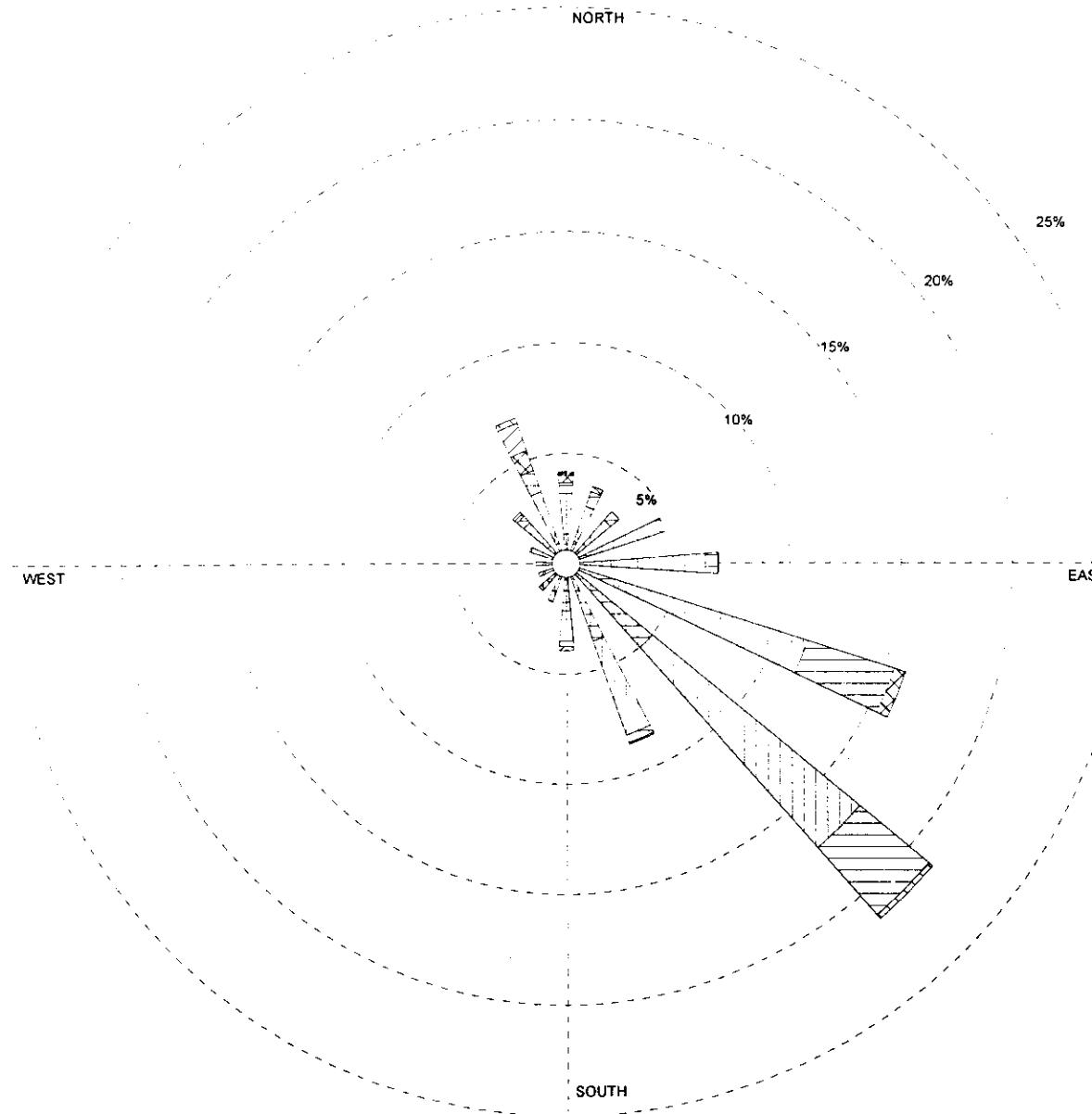
	A	B	C	D	E	F	Total
N	0.001374	0.003205	0.006868	0.054029	0.008242	0.005037	0.078755
NNE	0.001374	0.002289	0.005495	0.021062	0.006410	0.006410	0.043040
NE	0.002747	0.005495	0.003205	0.007784	0.005037	0.005495	0.029762
ENE	0.002289	0.005037	0.008700	0.008700	0.003663	0.010073	0.038462
E	0.003205	0.010989	0.017857	0.010073	0.008700	0.010073	0.060897
ESE	0.003205	0.016484	0.026099	0.048535	0.009615	0.010073	0.114011
SE	0.003205	0.009158	0.031593	0.077839	0.023352	0.016026	0.161172
SSE	0.001374	0.003663	0.004579	0.025641	0.011447	0.005952	0.052656
S	0.001374	0.002747	0.005495	0.009615	0.004121	0.004121	0.027473
SSW	0.001832	0.003663	0.005495	0.008700	0.002747	0.001374	0.023810
SW	0.000916	0.004579	0.008242	0.009158	0.002747	0.004579	0.030220
WSW	0.001374	0.004121	0.005037	0.004579	0.003663	0.002747	0.021520
W	0.000458	0.006410	0.005037	0.004121	0.001832	0.002289	0.020147
WNW	0.001374	0.004579	0.009158	0.010989	0.005495	0.004579	0.036172
NW	0.002747	0.005495	0.007326	0.039835	0.014652	0.003663	0.073718
NNW	0.000916	0.003663	0.009615	0.125000	0.009615	0.006410	0.155220
Total	0.029762	0.091575	0.159799	0.465659	0.121337	0.098901	

Frequency of Calm Winds : 3.30%

Average Wind Speed : 4.18 m/s

WIND ROSE PLOT

Maxwell Station



MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	5/17/2001	
DISPLAY	UNIT	COMMENTS
Wind Speed	m/s	
AVG. WIND SPEED	CALM WINDS	
2.69 m/s	9.01%	
ORIENTATION	PLOT YEAR-DATE-TIME	PROJECT/PLOT NO.
Direction (blowing from)	99 July 1 - September 30 Midnight - 11 PM	3Q 1999

Station ID : 0
Years : 1999
Start Date : July 1
Start Time : Midnight

RUN ID :
End Date : September 30
End Time : 11 PM

Frequency Distribution
(Count)

Wind Direction (Blowing From) / Wind Speed (m/s)

	0.51-2.06	2.06-3.60	3.60-5.66	5.66-8.75	8.75-10.80	>10.80	Total
N	30	41	11	8	2	2	94
NNE	24	37	16	6	0	0	83
NE	26	32	12	0	0	0	70
ENE	33	66	5	0	0	0	104
E	45	93	13	1	0	0	152
ESE	57	194	90	12	0	0	353
SE	111	267	89	5	0	0	472
SSE	82	100	8	2	0	0	192
S	47	31	5	4	0	0	87
SSW	30	10	0	1	0	0	41
SW	25	8	3	0	0	0	36
WSW	23	7	0	0	0	0	30
W	21	9	0	0	0	0	30
WNW	14	23	2	0	0	0	39
NW	24	31	9	3	3	0	70
NNW	22	55	23	21	29	6	156
Total	614	1004	286	63	34	8	

Frequency of Calm Winds : 199

Average Wind Speed : 2.69 m/s

Station ID : 0
Years : 1999
Start Date : July 1
Start Time : Midnight

RUN ID :
End Date : September 30
End Time : 11 PM

Frequency Distribution
(Normalized)

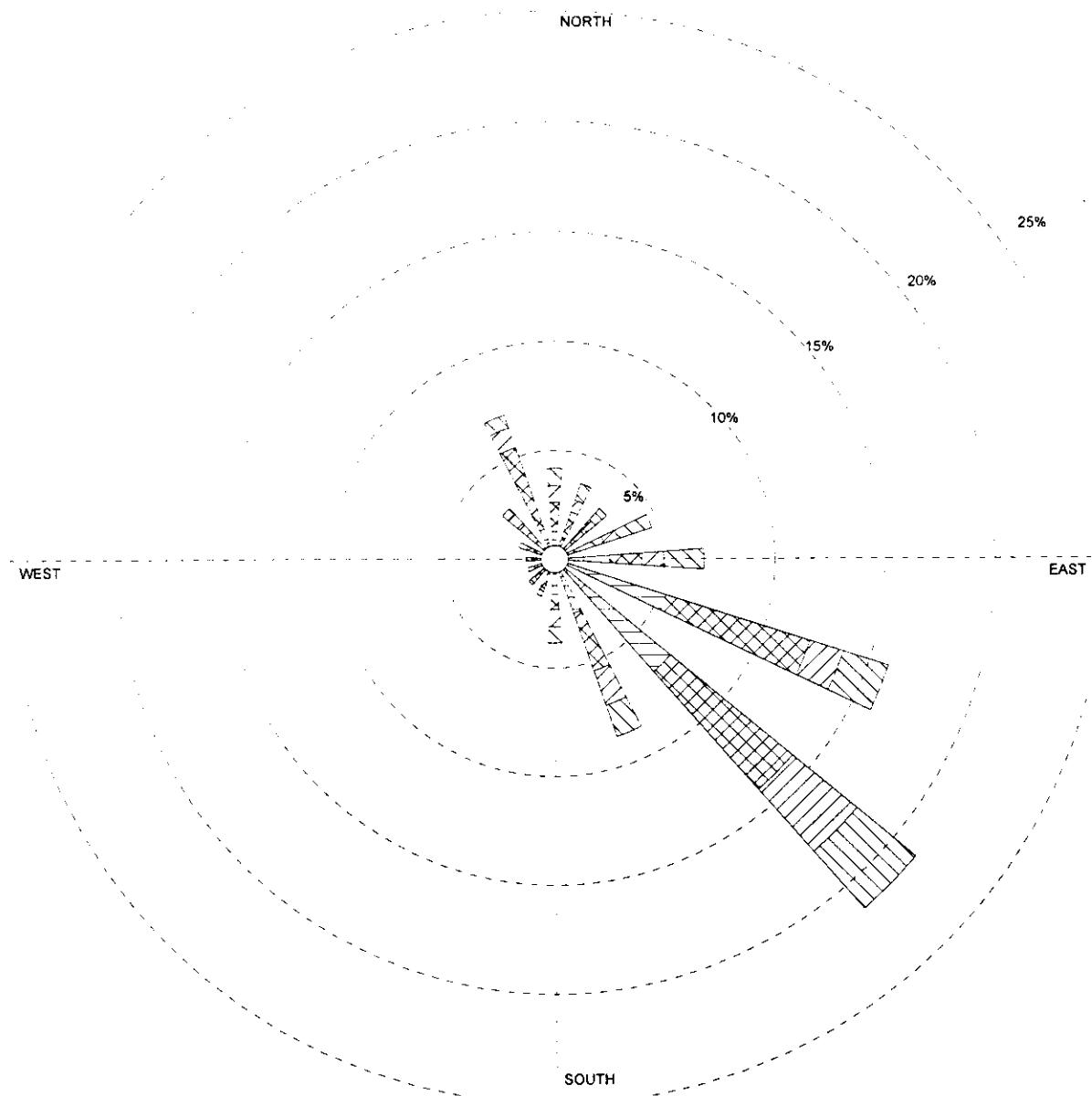
Wind Direction (Blowing From) / Wind Speed (m/s)

	0.51-2.06	2.06-3.60	3.60-5.66	5.66-8.75	8.75-10.80	>10.80	Total
N	0.013587	0.018569	0.004982	0.003623	0.000906	0.000906	0.042572
NNE	0.010870	0.016757	0.007246	0.002717	0.000000	0.000000	0.037591
NE	0.011775	0.014493	0.005435	0.000000	0.000000	0.000000	0.031703
ENE	0.014946	0.029891	0.002264	0.000000	0.000000	0.000000	0.047101
E	0.020380	0.042120	0.005888	0.000453	0.000000	0.000000	0.068841
ESE	0.025815	0.087862	0.040761	0.005435	0.000000	0.000000	0.159873
SE	0.050272	0.120924	0.040308	0.002264	0.000000	0.000000	0.213768
SSE	0.037138	0.045290	0.003623	0.000906	0.000000	0.000000	0.086957
S	0.021286	0.014040	0.002264	0.001812	0.000000	0.000000	0.039402
SSW	0.013587	0.004529	0.000000	0.000453	0.000000	0.000000	0.018569
SW	0.011322	0.003623	0.001359	0.000000	0.000000	0.000000	0.016304
WSW	0.010417	0.003170	0.000000	0.000000	0.000000	0.000000	0.013587
W	0.009511	0.004076	0.000000	0.000000	0.000000	0.000000	0.013587
WNW	0.006341	0.010417	0.000906	0.000000	0.000000	0.000000	0.017663
NW	0.010870	0.014040	0.004076	0.001359	0.001359	0.000000	0.031703
NNW	0.009964	0.024909	0.010417	0.009511	0.013134	0.002717	0.070652
Total	0.278080	0.454710	0.129529	0.028533	0.015399	0.003623	

Frequency of Calm Winds : 9.01%

Average Wind Speed : 2.69 m/s

WIND ROSE PLOT

Maxwell Station

STABILITY CLASS	MODELER	DATE	COMPANY NAME
F		5/17/2001	
E	DISPLAY	UNIT	COMMENTS
D	Stability Classes	N/A	
C	AVG. WIND SPEED	CALM WINDS	
B	2.69 m/s	9.01%	
A	ORIENTATION Direction (blowing from)	PLOT YEAR-DATE-TIME 99 July 1 - September 30 Midnight - 11 PM	PROJECT/PLOT NO. 3Q 1999

Station ID : 0
Years : 1999
Start Date : July 1
Start Time : Midnight

RUN ID :
End Date : September 30
End Time : 11 PM

Frequency Distribution
(Count)

Wind Direction (Blowing From) / Stability Classes

	A	B	C	D	E	F	Total
N	6	8	15	30	17	18	94
NNE	1	15	8	28	13	18	83
NE	8	6	10	19	12	15	70
ENE	5	16	20	12	15	36	104
E	14	16	26	33	22	41	152
ESE	5	28	86	151	35	48	353
SE	4	36	112	159	84	77	472
SSE	7	13	39	62	37	34	192
S	1	14	22	15	18	17	87
SSW	1	5	6	5	15	9	41
SW	2	6	8	7	5	8	36
WSW	1	4	5	4	6	10	30
W	0	4	5	5	5	11	30
WNW	2	3	9	9	8	8	39
NW	7	8	10	22	15	8	70
NNW	6	12	15	88	21	14	156
Total	70	194	396	649	328	372	

Frequency of Calm Winds : 199

Average Wind Speed : 2.69 m/s

Station ID : 0
Years : 1999
Start Date : July 1
Start Time : Midnight

RUN ID :
End Date : September 30
End Time : 11 PM

Frequency Distribution
(Normalized)

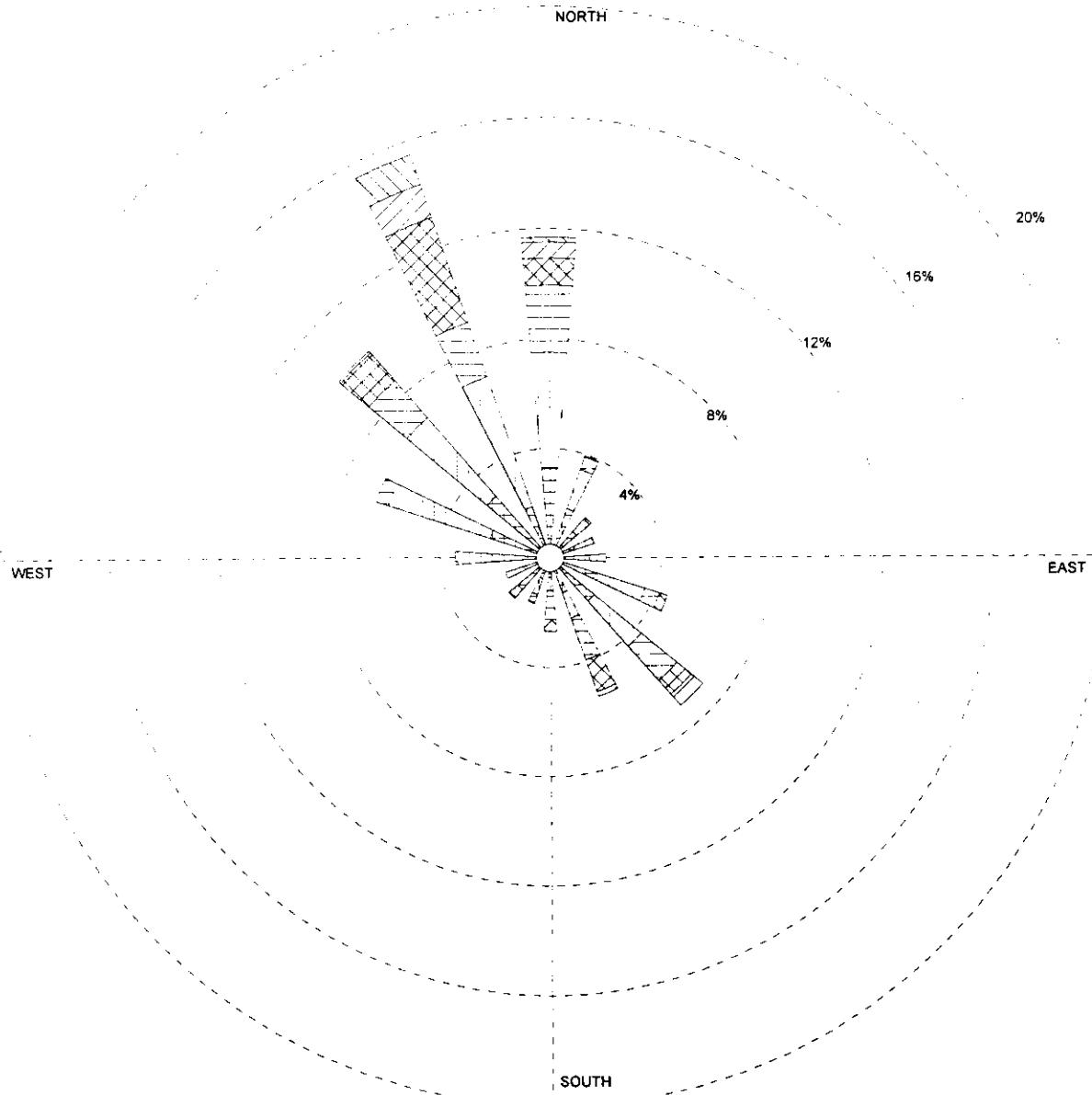
Wind Direction (Blowing From) / Stability Classes

	A	B	C	D	E	F	Total
N	0.002717	0.003623	0.006793	0.013587	0.007699	0.008152	0.042572
NNE	0.000453	0.006793	0.003623	0.012681	0.005888	0.008152	0.037591
NE	0.003623	0.002717	0.004529	0.008605	0.005435	0.006793	0.031703
ENE	0.002264	0.007246	0.009058	0.005435	0.006793	0.016304	0.047101
E	0.006341	0.007246	0.011775	0.014946	0.009964	0.018569	0.068841
ESE	0.002264	0.012681	0.038949	0.068388	0.015851	0.021739	0.159873
SE	0.001812	0.016304	0.050725	0.072011	0.038043	0.034873	0.213768
SSE	0.003170	0.005888	0.017663	0.028080	0.016757	0.015399	0.086957
S	0.000453	0.006341	0.009964	0.006793	0.008152	0.007699	0.039402
SSW	0.000453	0.002264	0.002717	0.002264	0.006793	0.004076	0.018569
SW	0.000906	0.002717	0.003623	0.003170	0.002264	0.003623	0.016304
WSW	0.000453	0.001812	0.002264	0.001812	0.002717	0.004529	0.013587
W	0.000000	0.001812	0.002264	0.002264	0.002264	0.004982	0.013587
WNW	0.000906	0.001359	0.004076	0.004076	0.003623	0.003623	0.017663
NW	0.003170	0.003623	0.004529	0.009964	0.006793	0.003623	0.031703
NNW	0.002717	0.005435	0.006793	0.039855	0.009511	0.006341	0.070652
Total	0.031703	0.087862	0.179348	0.293931	0.148551	0.168478	

Frequency of Calm Winds : 9.01%

Average Wind Speed : 2.69 m/s

WIND ROSE PLOT

Maxwell Station

MODELER	DATE	COMPANY NAME
Wind Speed (m/s)	5/17/2001	
DISPLAY	UNIT	COMMENTS
Wind Speed	m/s	
AVG WIND SPEED	CALM WINDS	
3.26 m/s	17.44%	
ORIENTATION	PLOT YEAR-DATE-TIME	PROJECT/PLOT NO
Direction (blowing from)	99 October 1 - December 31 Midnight - 11 PM	4Q 1999

Station ID : 0
Years : 1999
Start Date : October 1
Start Time : Midnight

RUN ID :
End Date : December 31
End Time : 11 PM

Frequency Distribution
(Count)

Wind Direction (Blowing From) / Wind Speed (m/s)

	0.51-2.06	2.06-3.60	3.60-5.66	5.66-8.75	8.75-10.80	>10.80	Total
N	73	93	54	22	13	4	259
NNE	42	34	11	1	0	0	88
NE	28	14	2	0	0	0	44
ENE	21	16	1	0	0	0	38
E	32	13	0	0	0	0	45
ESE	39	41	12	7	0	0	99
SE	46	49	37	15	12	0	159
SSE	30	22	36	27	4	0	119
S	16	11	23	10	0	0	60
SSW	18	14	7	1	0	0	40
SW	34	9	0	1	0	0	44
WSW	22	16	0	0	0	0	38
W	48	27	2	0	0	0	77
WNW	51	86	11	0	0	0	148
NW	66	84	40	30	2	0	222
NNW	44	111	46	89	28	25	343
Total	610	640	282	203	59	29	

Frequency of Calm Winds : 385

Average Wind Speed : 3.26 m/s

Station ID : 0
Years : 1999
Start Date : October 1
Start Time : Midnight

RUN ID :
End Date : December 31
End Time : 11 PM

Frequency Distribution
(Normalized)

Wind Direction (Blowing From) / Wind Speed (m/s)

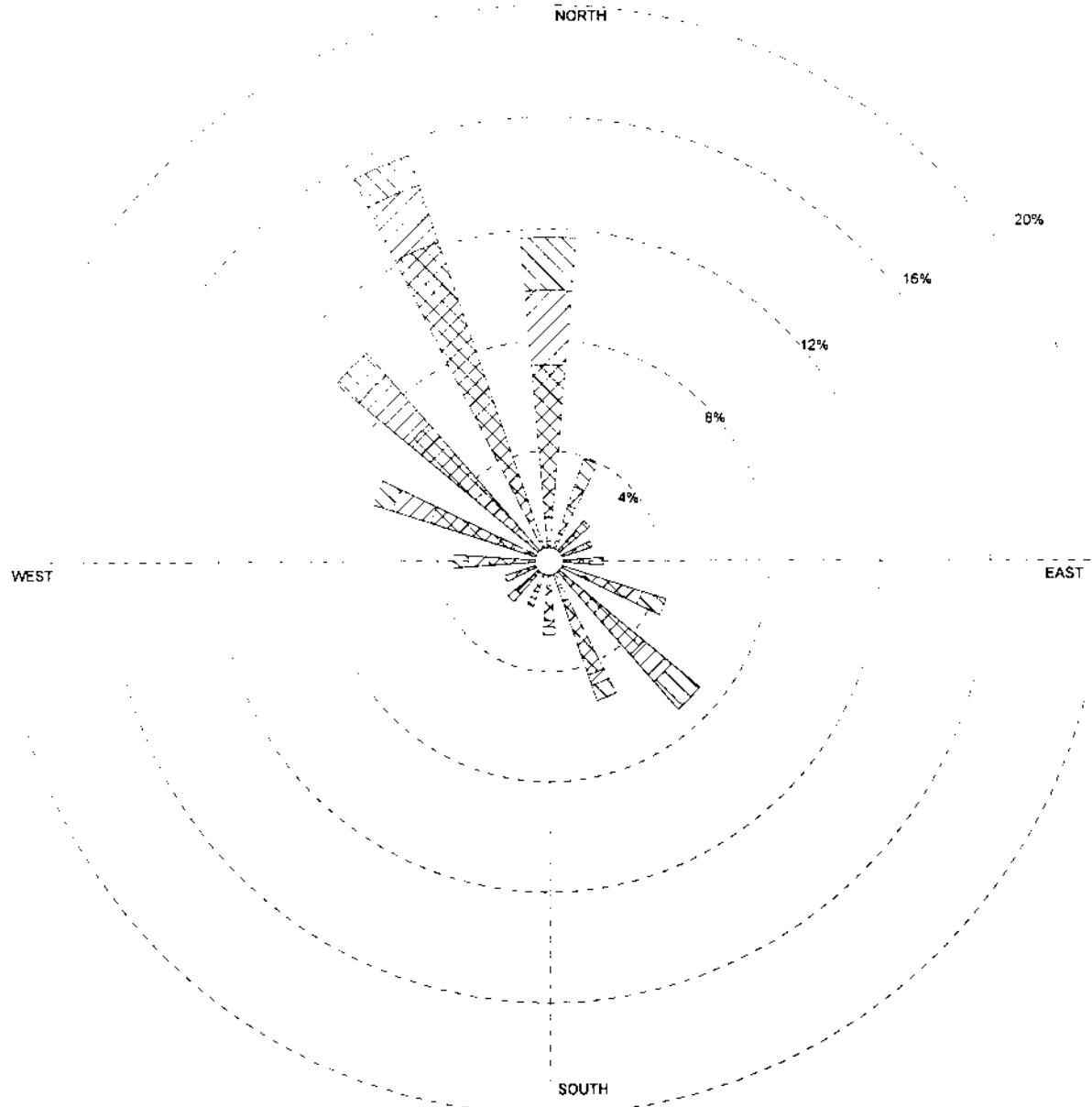
	0.51-2.06	2.06-3.60	3.60-5.66	5.66-8.75	8.75-10.80	>10.80	Total
N	0.033062	0.042120	0.024457	0.009964	0.005888	0.001812	0.117301
NNE	0.019022	0.015399	0.004982	0.000453	0.000000	0.000000	0.039855
NE	0.012681	0.006341	0.000906	0.000000	0.000000	0.000000	0.019928
ENE	0.009511	0.007246	0.000453	0.000000	0.000000	0.000000	0.017210
E	0.014493	0.005888	0.000000	0.000000	0.000000	0.000000	0.020380
ESE	0.017663	0.018569	0.005435	0.003170	0.000000	0.000000	0.044837
SE	0.020833	0.022192	0.016757	0.006793	0.005435	0.000000	0.072011
SSE	0.013587	0.009964	0.016304	0.012228	0.001812	0.000000	0.053895
S	0.007246	0.004982	0.010417	0.004529	0.000000	0.000000	0.027174
SSW	0.008152	0.006341	0.003170	0.000453	0.000000	0.000000	0.018116
SW	0.015399	0.004076	0.000000	0.000453	0.000000	0.000000	0.019928
WSW	0.009964	0.007246	0.000000	0.000000	0.000000	0.000000	0.017210
W	0.021739	0.012228	0.000906	0.000000	0.000000	0.000000	0.034873
WNW	0.023098	0.038949	0.004982	0.000000	0.000000	0.000000	0.067029
NW	0.029891	0.038043	0.018116	0.013587	0.000906	0.000000	0.100543
NNW	0.019928	0.050272	0.020833	0.040308	0.012681	0.011322	0.155344
Total	0.276268	0.289855	0.127717	0.091938	0.026721	0.013134	

Frequency of Calm Winds : 17.44%

Average Wind Speed : 3.26 m/s

WIND ROSE PLOT

Maxwell Station



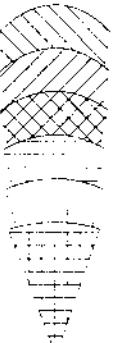
MODELER

DATE

COMPANY NAME

Stability Class

5/17/2001



DISPLAY

UNIT

COMMENTS

Stability Classes

N/A

AVG. WIND SPEED

CALM WINDS

3.26 m/s

17.44%

ORIENTATION

PLOT YEAR-DATE-TIME

**Direction
(blowing from)**99
October 1 - December 31
Midnight - 11 PM

PROJECT/PLOT NO.

4Q 1999

Station ID : 0
Years : 1999
Start Date : October 1
Start Time : Midnight

RUN ID :
End Date : December 31
End Time : 11 PM

Frequency Distribution
(Count)

Wind Direction (Blowing From) / Stability Classes

	A	B	C	D	E	F	Total
N	4	9	23	121	60	42	259
NNE	1	7	16	24	16	24	88
NE	0	7	9	13	5	10	44
ENE	0	2	10	12	7	7	38
E	2	2	11	14	4	12	45
ESE	1	4	27	35	12	20	99
SE	3	7	17	73	29	30	159
SSE	4	17	14	62	9	13	119
S	1	4	15	28	5	7	60
SSW	2	10	10	5	6	7	40
SW	3	4	6	8	14	9	44
WSW	1	4	8	6	10	9	38
W	5	11	12	21	16	12	77
WNW	7	4	19	70	32	16	148
NW	3	9	24	110	52	24	222
NNW	3	10	23	234	48	25	343
Total	40	111	244	836	325	267	

Frequency of Calm Winds : 385

Average Wind Speed : 3.26 m/s

Station ID : 0
Years : 1999
Start Date : October 1
Start Time : Midnight

RUN ID :
End Date : December 31
End Time : 11 PM

Frequency Distribution
(Normalized)

Wind Direction (Blowing From) / Stability Classes

	A	B	C	D	E	F	Total
N	0.001812	0.004076	0.010417	0.054801	0.027174	0.019022	0.117301
NNE	0.000453	0.003170	0.007246	0.010870	0.007246	0.010870	0.039855
NE	0.000000	0.003170	0.004076	0.005888	0.002264	0.004529	0.019928
ENE	0.000000	0.000906	0.004529	0.005435	0.003170	0.003170	0.017210
E	0.000906	0.000906	0.004982	0.006341	0.001812	0.005435	0.020380
ESE	0.000453	0.001812	0.012228	0.015851	0.005435	0.009058	0.044837
SE	0.001359	0.003170	0.007699	0.033062	0.013134	0.013587	0.072011
SSE	0.001812	0.007699	0.006341	0.028080	0.004076	0.005888	0.053895
S	0.000453	0.001812	0.006793	0.012681	0.002264	0.003170	0.027174
SSW	0.000906	0.004529	0.004529	0.002264	0.002717	0.003170	0.018116
SW	0.001359	0.001812	0.002717	0.003623	0.006341	0.004076	0.019928
WSW	0.000453	0.001812	0.003623	0.002717	0.004529	0.004076	0.017210
W	0.002264	0.004982	0.005435	0.009511	0.007246	0.005435	0.034873
WNW	0.003170	0.001812	0.008605	0.031703	0.014493	0.007246	0.067029
NW	0.001359	0.004076	0.010870	0.049819	0.023551	0.010870	0.100543
NNW	0.001359	0.004529	0.010417	0.105978	0.021739	0.011322	0.155344
Total	0.018116	0.050272	0.110507	0.378623	0.147192	0.120924	

Frequency of Calm Winds : 17.44%

Average Wind Speed : 3.26 m/s

APPENDIX G4

CONSTRUCTION EMISSIONS CALCULATIONS

Fugitive Dust During Construction for CCP

Uncontrolled Emission Factor ^a	0.11	tons PM10/acre-month
Controlled Emission Factor	0.011	tons PM10/acre-month
Control Efficiency ^b	90%	

Month	Construction Trailer and Parking Areas (acres)	Construction Laydown Area (acres)	Power Block Area (acres)	Switchyard (acres)	Plant Access Road (acres)	Transmission Line Interconnection (acres)	Water Supply Pipeline (acres)	Teresa Creek Bridge (acres)	Disturbed Area (acres)	Uncontrolled Emissions (tons/month)	Controlled Emissions (tons/month)
-1									2.0	2	0.22
1	5.0	20.0	15.00	20.0	7.4	4.3	0	2.0	73.7	8.11	0.81
2	5.0	20.0	15.00	20.0	7.4	4.3	0	2.0	73.7	8.11	0.81
3	2.5	10.0	7.50	10.0	3.7	2.2	0	0	35.85	3.94	0.39
4	2.5	10.0	7.38	10.0	3.7	2.2	0	0	35.73	3.93	0.39
5	2.5	10.0	7.37	10.0	3.7	2.2	0	0	35.72	3.93	0.39
6	2.5	10.0	7.32	10.0	3.7	2.2	2.4	0	38.02	4.18	0.42
7	2.5	10.0	7.30	10.0	3.7	2.2	2.4	0	38	4.18	0.42
8	2.5	10.0	7.21	10.0	3.7	2.2	2.4	0	37.91	4.17	0.42
9	2.5	10.0	7.18	10.0	3.7	2.2	2.4	0	37.88	4.17	0.42
10	2.5	10.0	7.10	10.0	3.7	2.2	2.4	0	37.8	4.16	0.42
11	2.5	10.0	7.09	10.0	3.7	2.2	2.4	0	37.785	4.16	0.42
12	2.5	10.0	7.07	10.0	3.7	2.2	2.4	0	37.77	4.15	0.42
13	2.5	10.0	7.06	10.0	3.7	2.2	2.4	0	37.755	4.15	0.42
14	2.5	10.0	7.04	10.0	3.7	2.2	2.4	0	37.74	4.15	0.42
15	2.5	10.0	7.03	10.0	3.7	2.2	2.4	0	37.725	4.15	0.41
16	2.5	10.0	7.02	10.0	3.7	2.2	2.4	0	37.715	4.15	0.41
17	2.5	10.0	7.01	10.0	3.7	2.2	2.4	0	37.705	4.15	0.41
18	2.5	10.0	7.00	10.0	3.7	2.2	2.4	0	37.7	4.15	0.41
19	2.5	10.0	7.00	10.0	3.7	2.2	2.4	0	37.7	4.15	0.41
20	2.5	10.0	7.00	10.0	3.7	2.2	2.4	0	37.7	4.15	0.41
21	2.5	0	0	0	0	0	0	0	2.5	0.28	0.03
22	2.5	0	0	0	0	0	0	0	2.5	0.28	0.03

Worst-Case Onsite Controlled Emissions

Months	Total Annual Emissions (tons/year)		
-1-11	5.33	Annual Worst-case Emission Rate (ton/year)	5.7
1-12	5.72	Annual Worst-case Emission Rate (g/s) ^c	0.16
2-13	5.32	Monthly Worst-case Emission Rate (ton/month)	0.8
3-14	4.93	24-hour Worst-Case Emissions (lb/day)	73.7
4-15	4.95	24-hour Worst-Case Emissions (lb/hr)	3.07
5-16	4.97	1-hour Worst-case Emission Rate (lb/hr) ^d	7.4
6-17	4.99	1-hour Worst-case Emission Rate (g/s)	0.93
7-18	4.99		
8-19	4.99		
9-20	4.98		
10-21	4.59		
11-22	4.21		

^aUncontrolled emission factor from Midwest Research Institute (MRI, 1996).

^bA 90% control efficiency was assumed due to fugitive dust compliance program.

^c Based on 8760 hours per year.

^d Based on 22 days/month and 10 hrs/day.

CONSTRUCTION EQUIPMENT HOURLY EMISSIONS FACTORS													
Construction Equipment	Fuel	Engine HP	Load Factor	Emission Factors, g/hp-hr					Hourly Emissions, lb/hr				
				NOx	CO	VOC	SOx	PM10	NOx	CO	VOC	SOx	PM10
Excavator Loader	Diesel	150	0.8	1.10	6.80	1.43	0.85	1.05	0.29	1.80	0.38	0.22	0.28
Excavator Backhoe	Diesel	150	0.8	1.10	6.80	1.43	0.85	1.05	0.29	1.80	0.38	0.22	0.28
Dozer Tractor Crawler	Diesel	100	0.7	10.30	4.80	1.29	0.85	1.11	1.59	0.74	0.20	0.13	0.17
Front End Loader	Diesel	100	0.9	10.30	4.80	1.29	0.85	1.11	2.04	0.95	0.26	0.17	0.22
Trenching Machine	Diesel	20	0.9	10.30	4.80	1.29	0.85	1.11	0.41	0.19	0.05	0.03	0.04
Excavator Motor Grader	Diesel	100	0.9	10.44	3.18	0.45	0.91	0.45	2.07	0.63	0.09	0.18	0.09
Vibrating Plate Compactor	Gasoline	8	0.65	8.00	5.00	1.22	0.93	1.00	0.09	0.06	0.01	0.01	0.01
Roller Vibrator	Diesel	100	0.65	8.00	5.00	1.22	0.93	1.00	1.14	0.72	0.17	0.13	0.14
Water Truck	Diesel	150	0.5	9.60	2.80	0.86	0.89	0.80	1.58	0.46	0.14	0.15	0.13
Concrete Mixer	Gasoline	20	0.8	9.60	2.80	0.86	0.89	0.80	0.34	0.10	0.03	0.03	0.03
Concrete Pump,trailer mount	Diesel	50	0.65	9.60	2.80	0.86	0.89	0.80	0.69	0.20	0.06	0.06	0.06
Mortar Mixer	Gasoline	11	0.65	9.60	2.80	0.86	0.89	0.80	0.15	0.04	0.01	0.01	0.01
Paving Machine	Diesel	100	0.85	10.44	3.18	0.45	0.91	0.45	1.95	0.59	0.08	0.17	0.08
Dump Truck	Diesel	150	0.65	9.60	2.80	0.86	0.89	0.80	2.06	0.60	0.18	0.19	0.17
Crane (6-ton)	Diesel	30	0.5	10.30	4.20	1.29	0.93	1.44	0.34	0.14	0.04	0.03	0.05
Crane (20-ton)	Diesel	75	0.5	10.30	4.20	1.29	0.93	1.44	0.85	0.35	0.11	0.08	0.12
Crane (50-ton)	Diesel	150	0.5	10.30	4.20	1.29	0.93	1.44	1.70	0.69	0.21	0.15	0.24
Crane (100-ton)	Diesel	270	0.5	10.30	4.20	1.29	0.93	1.44	3.06	1.25	0.38	0.28	0.43
Crane (300-ton)	Diesel	450	0.5	10.30	4.20	1.29	0.93	1.44	5.10	2.08	0.64	0.46	0.71
Crane (360-ton)	Diesel	450	0.5	10.30	4.20	1.29	0.93	1.44	5.10	2.08	0.64	0.46	0.71
Crane (500-ton)	Diesel	685	0.75	10.30	4.20	1.29	0.93	1.44	11.64	4.75	1.46	1.05	1.63
Manlift, telescoping	Diesel	43	0.75	9.60	2.80	0.86	0.89	0.80	0.68	0.20	0.06	0.06	0.06
Welder (250 amp)	Diesel	35	0.75	8.17	4.99	0.91	0.91	0.45	0.47	0.29	0.05	0.05	0.03
Air Compressor (185 cfm)	Diesel	5	0.75	8.00	5.00	1.22	0.93	1.00	0.07	0.04	0.01	0.01	0.01
Air Compressor (750 cfm)	Diesel	25	0.75	8.00	5.00	1.22	0.93	1.00	0.33	0.21	0.05	0.04	0.04
Generator (6 kW)	Diesel	30	0.75	8.00	5.00	1.22	0.93	1.00	0.40	0.25	0.06	0.05	0.05
Forklift (2-ton)	Gasoline	62	0.8	10.10	6.80	1.43	0.85	1.05	1.10	0.74	0.16	0.09	0.11
Forklift (4-ton)	Diesel	83	0.8	10.10	6.80	1.43	0.85	1.05	1.48	0.99	0.21	0.12	0.15
Fuel/Lube Truck	Diesel	175	0.5	9.60	2.80	0.86	0.89	0.80	1.85	0.54	0.17	0.17	0.15
Pickup Truck (1/2-ton)	Gasoline	150	0.8	10.10	2.80	0.86	0.89	0.80	2.67	0.74	0.23	0.23	0.21
Stakebed Truck	Diesel	325	0.5	10.30	4.20	1.29	0.93	1.44	3.68	1.50	0.46	0.33	0.51
Hydraulic Boom Truck	Diesel	260	0.5	10.30	4.20	1.29	0.93	1.44	2.95	1.20	0.37	0.27	0.41
Concrete Trowel	Gasoline	8	0.8	10.10	6.80	1.43	0.85	1.05	0.14	0.10	0.02	0.01	0.01
Concrete Floor Saw	Gasoline	14	0.8	10.10	6.80	1.43	0.85	1.05	0.25	0.17	0.04	0.02	0.03
Bobcat Skip Loader	Diesel	70	0.8	10.10	6.80	1.43	0.85	1.05	1.24	0.84	0.18	0.10	0.13
Hydrotest Pump	Diesel	25	0.76	8.00	5.00	1.22	0.93	1.00	0.33	0.21	0.05	0.04	0.04

TABLE A - CONSTRUCTION EQUIPMENT MONTHLY SUMMARY

Construction Equipment	Aver. Hours per Day	Average Units On Site Per Month																						Total Months
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
Excavator Loader	7	1	3	3	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20
Excavator Backhoe	7	1	3	3	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20
Dozer Tractor Crawler	7	1	1																					2
Fron End Loader	7				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	13
Trenching Machine	6	1	2	2	1																			6
Excavator Motor Grader	7	1	1	1																				3
Vibrating Plate Compactor	6	1	2	2	2	2	3	3	3	3	3	3	3	2	1	1	1	1	1					34
Roller Vibrator	6			1	1	1	2	2	2	2	1	1	1	1	1									15
Water Truck	6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	17
Concrete Mixer	3		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
Concrete Pump, trailer mount	3				1	1	1	1	1	1	1	1	1	1										8
Mortar Mixer	4			1	1	2	2	2	2	2	2	1	1	1										18
Paving Machine	5	1	1																	1	1	1		5
Dump Truck	7			1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	31
Crane (6-ton)	7		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	17
Crane (20-ton)	7	1	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	1					36
Crane (50-ton)	7	1	2	2	2	3	3	3	3	4	4	4	4	3	3	2	2	2	1					43
Crane (100-ton)	7				1	1	1	1	1	1	1	1	1	1	1	1	1	1						11
Crane (300-ton)	8							1	1	1	1	1	1	1										6
Crane (360-ton)	8							1	1	1	1	1	1	1										6
Crane (500-ton)	8							1	1	1	1	1	1											4
Manlift, telescoping	4			1	1	2	2	2	2	2	2	2	2	2	2	1	2	1	1	1	1	1	1	28
Welder (250 amp)	6		1	1	2	2	2	3	4	4	4	3	3	2	2	2	2	2	1	1	1			41
Air Compressor (185 cfm)	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20
Air Compressor (750 cfm)	8				1	2	2	2	2	2	2	2	1	1	1	1	1	1						20
Generator (6 kW)	8	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2					30
Forklift (2-ton)	6	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	25
Forklift (4-ton)	6			1	1	1	1	2	2	2	2	2	2	2	2	2	2	2						26
Fuel/Lube Truck	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	22
Pickup Truck (1/2-ton)	5	3	3	3	3	3	5	5	5	5	5	5	5	5	5	5	5	5	4	4	3	2	2	90
Stakebed Truck	6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	18
Hydrolic Boom Truck	4		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	17
Concrete Trowel	3	1	1	2	2	2	2	2	2	1	1	1	1											17
Concrete Floor Saw	2					1	1	1	1	1	1	1	1	1	1	1	1	1						12
Bobcat Skip Loader	6	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		32
Hydrotest Pump	3																		1	1	1	1		4

Notes:

1. Above estimates are for a single shift execution and 5/10 work week.
2. Load factor is equivalent fraction of time equipment operated at 100% capacity during work week.
3. For equipment hourly emissins, see Table B.

TABLE K-3-4 CONSTRUCTION MONTHLY CO EMISSIONS SUMMARY

Construction Equipment	CO Emissions Per Month of Construction																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Excavator Loader	326.7	980.2	980.2	980.2	653.5	653.5	326.7	326.7	326.7	326.7	326.7	326.7	-	-	-	-	-	-	-	-	-	-
Excavator Backhoe	326.7	980.2	980.2	980.2	653.5	653.5	326.7	326.7	326.7	326.7	326.7	326.7	-	-	-	-	-	-	-	-	-	-
Dozer Tractor Crawler	134.5	134.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Front End Loader	-	-	-	173.0	173.0	173.0	173.0	173.0	173.0	173.0	173.0	173.0	173.0	173.0	173.0	173.0	173.0	173.0	-	-	-	-
Trenching Machine	29.7	59.3	59.3	29.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Excavator Motor Grader	114.6	114.6	114.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vibrating Plate Compactor	8.9	17.8	17.8	17.8	17.8	26.8	26.8	26.8	26.8	26.8	26.8	17.8	8.9	8.9	8.9	8.9	8.9	-	-	-	-	-
Roller Vibrator	-	-	111.5	111.5	111.5	223.1	223.1	223.1	111.5	111.5	111.5	111.5	-	-	-	-	-	-	-	-	-	-
Water Truck	72.1	72.1	72.1	72.1	72.1	72.1	72.1	72.1	72.1	72.1	72.1	72.1	72.1	72.1	72.1	72.1	72.1	72.1	-	-	-	-
Concrete Mixer	-	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	-	-	-	-
Concrete Pump, trailer mount	-	-	-	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	-	-	-	-	-	-	-	-	-	-
Mortar Mixer	-	-	4.6	4.6	9.2	9.2	9.2	9.2	9.2	4.6	4.6	4.6	-	4.6	-	-	-	-	-	-	-	-
Paving Machine	77.3	77.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	77.3	77.3	77.3	-	-
Dump Truck	-	-	-	109.3	218.6	218.6	218.6	218.6	218.6	218.6	218.6	218.6	218.6	218.6	218.6	218.6	218.6	218.6	109.3	109.3	109.3	109.3
Crane (6-ton)	-	25.2	25.2	25.2	25.2	25.2	25.2	25.2	25.2	25.2	25.2	25.2	25.2	25.2	25.2	25.2	25.2	25.2	-	-	-	-
Crane (20-ton)	63.1	126.1	126.1	126.1	126.1	126.1	189.2	189.2	189.2	189.2	189.2	189.2	126.1	126.1	126.1	126.1	126.1	-	-	-	-	-
Crane (50-ton)	126.1	252.3	252.3	252.3	378.4	378.4	378.4	378.4	504.5	504.5	504.5	378.4	378.4	252.3	252.3	126.1	126.1	-	-	-	-	-
Crane (100-ton)	-	-	-	-	227.0	227.0	227.0	227.0	227.0	227.0	227.0	227.0	227.0	-	-	-	-	-	-	-	-	-
Crane (300-ton)	-	-	-	-	-	-	432.4	432.4	432.4	432.4	432.4	432.4	-	-	-	-	-	-	-	-	-	-
Crane (360-ton)	-	-	-	-	-	-	432.4	432.4	432.4	432.4	432.4	432.4	-	-	-	-	-	-	-	-	-	-
Crane (500-ton)	-	-	-	-	-	-	987.4	987.4	987.4	987.4	987.4	-	-	-	-	-	-	-	-	-	-	-
Manlift, telescoping	-	-	-	20.7	20.7	41.3	41.3	41.3	41.3	41.3	41.3	41.3	20.7	41.3	20.7	20.7	20.7	20.7	20.7	20.7	20.7	20.7
Welder (250 amp)	-	45.0	45.0	89.9	89.9	134.9	179.8	179.8	134.9	134.9	134.9	134.9	89.9	89.9	89.9	89.9	89.9	45.0	45.0	-	-	-
Air Compressor (185 cfm)	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	-	8.6	8.6	8.6	8.6	8.6	8.6	8.6	-	-
Air Compressor (750 cfm)	-	-	-	-	42.9	85.8	85.8	85.8	85.8	85.8	85.8	85.8	42.9	42.9	42.9	42.9	42.9	-	-	-	-	-
Generator (6 kW)	51.5	51.5	51.5	51.5	103.0	103.0	103.0	103.0	103.0	103.0	103.0	103.0	103.0	103.0	103.0	103.0	103.0	-	-	-	-	-
Forklift (2-ton)	115.8	115.8	115.8	115.8	115.8	231.5	231.5	231.5	231.5	231.5	231.5	231.5	115.8	115.8	115.8	115.8	115.8	115.8	115.8	115.8	115.8	115.8
Forklift (4-ton)	-	-	155.0	155.0	309.9	309.9	309.9	309.9	309.9	309.9	309.9	309.9	-	-	-	-	-	-	-	-	-	-
Fuel/Lube Truck	56.1	56.1	56.1	56.1	56.1	56.1	56.1	56.1	56.1	56.1	56.1	56.1	-	56.1	56.1	56.1	56.1	56.1	56.1	56.1	56.1	56.1
Pickup Truck (1/2-ton)	288.3	288.3	288.3	288.3	480.5	480.5	480.5	480.5	480.5	480.5	480.5	480.5	480.5	480.5	480.5	480.5	480.5	480.5	384.4	288.3	192.2	192.2
Stakebed Truck	234.2	234.2	234.2	234.2	234.2	234.2	234.2	234.2	234.2	234.2	234.2	234.2	-	234.2	234.2	234.2	234.2	-	-	-	-	-
Hydraulic Boom Truck	-	124.9	124.9	124.9	124.9	124.9	124.9	124.9	124.9	124.9	124.9	124.9	-	124.9	124.9	124.9	124.9	124.9	-	-	-	-
Concrete Trowel	7.5	7.5	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	-	-	-	-	-	-	-	-	-	-
Concrete Floor Saw	-	-	-	-	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	-	8.7	8.7	8.7	8.7	-	-	-	-	-
Bobcat Skip Loader	130.7	130.7	261.4	261.4	261.4	261.4	261.4	261.4	261.4	261.4	261.4	261.4	-	261.4	261.4	261.4	261.4	-	-	-	-	-
Hydrotest Pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.3	16.3	16.3	16.3	-
Total	2,172.3	3,909.7	4,107.1	4,326.4	4,368.4	4,744.6	6,167.2	6,212.1	6,330.8	5,978.6	5,066.6	4,865.5	3,230.3	2,967.4	3,008.9	2,567.5	1,980.8	1,260.6	941.9	598.6	494.0	494.0

Note: Above estimates are for a single shift execution and 5/10 work week.

Yearly Emissions (lbs/yr)	Worst-Case Emissions
Month 1-12	58,249.4
Month 2-13	59,307.4
Month 3-14	58,365.0
Month 4-15	57,266.8
Month 5-16	55,507.9
Month 6-17	53,120.3
Month 7-18	49,636.3
Month 8-19	44,411.0
Month 9-20	38,797.5
Month 10-21	#####
Month 11-22	#####

TABLE K-3-5 CONSTRUCTION MONTHLY VOC EMISSIONS SUMMARY

Construction Equipment	VOC Emissions Per Month of Construction																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
Excavator Loader	68.7	206.1	206.1	206.1	137.4	137.4	68.7	68.7	68.7	68.7	68.7	-	-	-	-	-	-	-	-	-	-	-	
Excavator Backhoe	68.7	206.1	206.1	206.1	137.4	137.4	68.7	68.7	68.7	68.7	68.7	-	-	-	-	-	-	-	-	-	-	-	
Dozer Tractor Crawler	36.2	36.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Front End Loader	-	-	-	46.5	46.5	46.5	46.5	46.5	46.5	46.5	46.5	46.5	46.5	46.5	46.5	46.5	46.5	46.5	-	-	-	-	
Trenching Machine	8.0	15.9	15.9	8.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Excavator Motor Grader	16.2	16.2	16.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Vibrating Plate Compactor	2.2	4.4	4.4	4.4	4.4	6.5	6.5	6.5	6.5	6.5	6.5	4.4	2.2	2.2	2.2	2.2	2.2	-	-	-	-	-	
Roller Vibrator	-	-	27.2	27.2	27.2	54.4	54.4	54.4	54.4	27.2	27.2	27.2	27.2	-	-	-	-	-	-	-	-	-	
Water Truck	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1	-	-	-	-	
Concrete Mixer	-	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	-	-	-	-	
Concrete Pump, trailer mount	-	-	-	4.8	4.8	4.8	4.8	4.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mortar Mixer	-	-	1.4	1.4	2.8	2.8	2.8	2.8	2.8	2.8	1.4	1.4	1.4	-	1.4	-	-	-	-	-	-	-	
Paving Machine	10.9	10.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.9	10.9	10.9	-	-	-	
Dump Truck	-	-	-	33.6	67.1	67.1	67.1	67.1	67.1	67.1	67.1	67.1	67.1	67.1	67.1	67.1	33.6	33.6	33.6	33.6	33.6	33.6	
Crane (6-ton)	-	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	-	-	-	-	-	-
Crane (20-ton)	19.4	38.7	38.7	38.7	38.7	58.1	58.1	58.1	58.1	38.7	38.7	38.7	38.7	38.7	19.4	-	-	-	-	-	-	-	-
Crane (50-ton)	38.7	77.5	77.5	77.5	116.2	116.2	116.2	116.2	155.0	155.0	155.0	116.2	116.2	77.5	77.5	38.7	38.7	-	-	-	-	-	-
Crane (100-ton)	-	-	-	-	69.7	69.7	69.7	69.7	69.7	69.7	69.7	69.7	69.7	69.7	69.7	-	-	-	-	-	-	-	-
Crane (300-ton)	-	-	-	-	-	-	132.8	132.8	132.8	132.8	132.8	-	-	-	-	-	-	-	-	-	-	-	-
Crane (360-ton)	-	-	-	-	-	-	132.8	132.8	132.8	132.8	132.8	-	-	-	-	-	-	-	-	-	-	-	-
Crane (500-ton)	-	-	-	-	-	-	-	303.3	303.3	303.3	303.3	-	-	-	-	-	-	-	-	-	-	-	-
Manlift, telescoping	-	-	-	6.3	6.3	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	6.3	12.7	6.3	6.3	6.3	6.3	6.3	6.3
Welder (250 amp)	-	8.2	8.2	16.4	16.4	16.4	24.6	32.8	32.8	32.8	24.6	24.6	16.4	16.4	16.4	16.4	8.2	8.2	-	-	-	-	-
Air Compressor (185 cfm)	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	-	-
Air Compressor (750 cfm)	-	-	-	-	10.5	20.9	20.9	20.9	20.9	20.9	10.5	10.5	10.5	10.5	10.5	10.5	-	-	-	-	-	-	-
Generator (6 kW)	12.6	12.6	12.6	12.6	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	-	-	-	-	-	-
Forklift (2-ton)	24.3	24.3	24.3	24.3	24.3	48.7	48.7	48.7	48.7	24.3	24.3	24.3	24.3	24.3	24.3	24.3	24.3	24.3	24.3	24.3	24.3	24.3	
Forklift (4-ton)	-	-	32.6	32.6	65.2	65.2	65.2	65.2	65.2	65.2	65.2	65.2	65.2	65.2	65.2	65.2	-	-	-	-	-	-	-
Fuel/Lube Truck	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	
Pickup Truck (1/2-ton)	88.5	88.5	88.5	88.5	147.6	147.6	147.6	147.6	147.6	147.6	147.6	147.6	147.6	147.6	147.6	147.6	118.1	118.1	88.5	59.0	59.0	-	-
Stakebed Truck	71.9	71.9	71.9	71.9	71.9	71.9	71.9	71.9	71.9	71.9	71.9	71.9	71.9	71.9	71.9	71.9	-	-	-	-	-	-	-
Hydrolic Boom Truck	-	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4	-	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4	-	-	-	-	-
Concrete Trowel	1.6	1.6	3.1	3.1	3.1	3.1	3.1	3.1	3.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Floor Saw	-	-	-	-	1.8	1.8	1.8	1.8	1.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bobcat Skip Loader	27.5	27.5	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	-	-	-	-	-	-	-
Hydrotest Pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.0	4.0	4.0	4.0	-	-	-
Total	536.9	936.6	979.8	1,055.0	1,110.5	1,215.8	1,699.2	1,707.4	1,744.5	1,654.6	1,380.1	1,322.4	889.6	815.9	827.6	692.0	536.5	353.3	259.1	172.1	140.5	140.5	-

Note: Above estimates are for a single shift execution and 5/10 work week.

Yearly Emissions (lbs/yr)	Worst-Case Emissions
Month 1-12	15,342.8
Month 2-13	15,695.5
Month 3-14	15,574.7
Month 4-15	15,422.5
Month 5-16	15,059.4
Month 6-17	14,485.4
Month 7-18	13,622.9
Month 8-19	12,182.9
Month 9-20	10,647.6
Month 10-21	9,043.59
Month 11-22	7,529.49
Worst Month	1744.5 lb/month
Worst 1-hr	6.7 lb/hr
Worst Year	15695.5 lb/year

APPENDIX G5

OPERATING EMISSIONS

Total Emissions for Reliant Colusa Power Plant

Source	Emissions (ton/yr)				
	NOx	CO	SO2	VOC	PM10
Turbines	163.44	377.36	10.05	47.04	139.29
Auxiliary Boiler	0.52	1.78	0.03	0.19	0.24
FW Pump Engine	0.422	0.100	0.032	0.010	0.007
TOTAL	164.38	379.24	10.11	47.24	139.54

Expected Turbine Operational Emissions for the Colusa Power Plant

Emissions Calculation Basis		Winter Minimum - 18 °F				Yearly Average - 60 °F				Summer Maximum - 114 °F			
CTG Load	100%	100%	80%	60%	100%	100%	80%	60%	100%	100%	80%	60%	
Fogger Status	Off	Off	Off	Off	On	On	Off	Off	On	On	Off	Off	
Duct Burner Status	On	Off	Off	Off	On	Off	Off	Off	On	Off	Off	Off	
Aqueous NH ₃ - Plant Usage (6)	lb/hr	345.4	213.7	178.7	149.8	333.0	201.1	167.3	141.0	336.1	190.2	144.2	121.3
CTG Heat Consumption [LHV]	mmBtu/hr	1,692	1,692	1,426	1,205	1,592	1,592	1,335	1,133	1,506	1,506	1,152	975
Duct Burner Duty [LHV]	mmBtu/hr	499	0	0	0	500	0	0	0	553	0	0	0
Exhaust Flow	lb/hr	3,879,637	3,855,000	3,137,000	2,681,000	3,621,683	3,597,000	2,979,000	2,564,000	3,436,308	3,409,000	2,689,000	2,378,000
Stack Diameter / Height	feet	19 / 140	19 / 140	19 / 140	19 / 140	19 / 140	19 / 140	19 / 140	19 / 140	19 / 140	19 / 140	19 / 140	19 / 140
Stack Velocity	ft/sec	62.7	64.3	51.2	43.1	58.7	59.6	48.5	41.1	58.5	58.3	44.5	38.9
Stack Temperature	°F	185	209	194	184	184	202	190	181	214	221	203	196
<hr/>													
Stack Emissions (Each)													
NO _x @ 15% O ₂	ppmvd	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
NO _x as NO ₂	lb/hr	17.73	13.74	11.49	9.63	16.93	12.93	10.76	9.07	16.65	12.23	9.28	7.80
CO @ 15% O ₂	ppmvd	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
CO	lb/hr	32.39	25.11	20.99	17.59	30.92	23.62	19.65	16.56	30.41	22.34	16.94	14.25
SO ₂ @ 15% O ₂	ppmvd	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
SO ₂ (4)	lb/hr	1.38	1.07	0.90	0.76	1.32	1.00	0.84	0.71	1.30	0.95	0.73	0.61
VOC @ 15% O ₂	ppmvd	2.22	1.02	0.99	1.01	2.28	1.01	1.01	1.03	2.44	1.02	1.05	1.10
VOC (7)	lb/hr	6.86	2.43	1.98	1.69	6.72	2.28	1.89	1.62	7.07	2.17	1.70	1.50
Additional sulfate particulate (5)	lb/hr	1.66	1.26	1.06	0.90	1.59	1.18	0.99	0.84	1.57	1.12	0.86	0.73
Total PM ₁₀ (including sulfate particulates)	lb/hr	19.20	13.26	13.06	12.90	19.13	13.18	12.99	12.84	19.70	13.12	12.86	12.73
Ammonia Slip @ 15% O ₂	ppmvd	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Ammonia Slip	lb/hr	16.41	12.72	10.64	8.91	15.67	11.97	9.96	8.39	15.41	11.32	8.58	7.22

Expected Operational Turbine Emissions (cont.)

Start Up/Shutdown Emissions (both CTs)

Cold Start		300 mins		Warm Start		130 mins		Hot Start		90 mins		Shutdown		30 mins	
		Total (lb)	(lb/hr)			Total (lb)	(lb/hr)			Total (lb)	(lb/hr)			Total (lb)	(lb/hr)
NOx	800.00	160.00		NOx	430.00	198.46		NOx	110.00	73.33		NOx	100.00	200.00	
CO	1588.00	317.60		CO	800.00	369.23		CO	750.00	500.00		CO	350.00	700.00	
UHC	675.00	135.00		UHC	200.00	92.31		UHC	200.00	133.33		UHC	170.00	340.00	
VOC	135.00	27.00		VOC	40.00	18.46		VOC	40.00	26.67		VOC	34.00	68.00	

Average Annual Emissions (Both Turbines, turbine operation assumed at 100% load, 60 °F)

Total Hours of Operation	8760
Total Number of Cold Starts	18.0
Cold Start Duration (hr)	5.00
Total Number of Warm Starts	50
Warm Start Duration (hr)	2.17
Total Number of Hot Starts	200.0
Hot Start Duration (hr)	1.50
Total Number of Shutdowns	268.0
Shutdown Duration (hr)	0.50
Duct Burner Operation (hr)	4000
Average Operation (hr)	4127.67

Pollutant	lb/yr	ton/yr
NOx	326,874	163.44
CO	754,720	377.36
SO2	20,098	10.05
VOC	94,079	47.04
PM10	278,578	139.29

Short term emissions (both turbines):

Pollutant	1-Hour emissions lbs/hr	3-Hour emissions lbs/hr	8-Hour emissions lbs/hr	24-Hour emissions lbs/day
NOx	198.46			1473.85
CO	500.00		222.79	2818.81
PM10	38.39			921.40
SO2	2.76	8.28		66.27
VOC	27.00			339.56

Short term emissions (each turbines):

Pollutant	1-Hour emissions lbs/hr	3-Hour emissions lbs/hr	8-Hour emissions lbs/hr	24-Hour emissions lbs/day
NOx	99.23			736.93
CO	250.00		111.40	1409.41
PM10	19.20			460.70
SO2	1.38	4.14		33.14
VOC	13.50			169.78

Auxiliary Boiler Emissions

Total Hours of Operation **2,400** hr/yr
 Firing Rate 40 MMBtu/hr
 Stack Gas Temp. 329 F
 Flue Gas Flow 20,414 cfm

Pollutant	lb/MMBtu	lb/hr	Emissions	
			lb/yr	ton/yr
NOx	0.0108	0.43	1,036.80	0.52
CO	0.037	1.48	3,552.00	1.78
SO2	0.0006	0.02	57.60	0.03
VOC	0.004	0.16	384.00	0.19
PM10	0.005	0.20	480.00	0.24

Toxic Species	lb/MMcf	lb/hr	ACE Emissions (g/s)	
			Hourly	Annual
Acetaldehyde	0.0147	5.76E-04	7.26E-05	1.99E-05
Benzene	0.0087	3.41E-04	4.30E-05	1.18E-05
Formaldehyde	0.672	2.64E-02	3.32E-03	9.10E-04
Naphthalene	0.0003	1.18E-05	1.48E-06	4.06E-07
Total PAHs	0.0001	3.92E-06	4.94E-07	1.35E-07
Propylene	0.53	2.08E-02	2.62E-03	7.17E-04
Toluene	0.0265	1.04E-03	1.31E-04	3.59E-05
Xylene (Total)	0.0197	7.73E-04	9.73E-05	2.67E-05
Ethylbenzene	0.0069	2.71E-04	3.41E-05	9.34E-06
Hexane	0.0046	1.80E-04	2.27E-05	6.23E-06

Emergency Firewater Pump Engine

Total Hours of Operation **114** hr/yr
Power 368 Bhp
Stack Gas Temp. 830 F
Exhaust Gas Flow 2,594.00 cfm

Pollutant	lb/Bhp-hr	lb/hr	Emissions	
			lb/yr	ton/yr
NOx	2.01E-02	7.41	844.42	4.22E-01
CO	4.76E-03	1.75	199.78	9.99E-02
SO2	1.52E-03	0.56	63.82	3.19E-02
VOC	4.85E-04	0.18	20.35	1.02E-02
PM10	3.53E-04	0.13	14.80	7.40E-03

Hours of operation based on 2 hours of testing every week plus 10 other hours of operation.

APPENDIX G6

BUILDING WAKE EFFECTS

'E:\Reliant\Colusa\Rcpp.bst BEESTWin GEP Files 5/9/2001 6:42:59 PM'

'ST'
'METERS' 1.0
'UTMY' 0
15
'H2OTreat' 1 56.1
4 5.4864
562906 4357342
562915 4357342
562915 4357327
562906 4357327
'Bulk' 1 59.5
4 5.4864
562993 4357346
563006 4357347
563006 4357342
562993 4357342
'DryCool' 1 56.9
4 30.48
562843 4357535
562907 4357536
562906 4357450
562842 4357449
'Control' 1 56.2
4 7.62
562924 4357397
562985 4357398
562985 4357372
562924 4357371
'WHRSGa' 1 56.4
4 24.384
562972 4357448
562983 4357448
562983 4357428
562972 4357428
'WHRSGb' 1 56.1
4 20.7264
562972 4357471
562983 4357471
562983 4357448
562972 4357448
'WCTG' 1 56.1
4 13.716
562974 4357506
562981 4357506
562981 4357475
562974 4357475
'Winlet' 1 56.2
4 17.0688
562971 4357516
562984 4357516
562984 4357510
562971 4357510
'EHRSGa' 1 57.7
4 24.384
563017 4357448
563028 4357448
563028 4357429
563017 4357429
'EHRSGb' 1 57.
4 20.7264
563017 4357471
563028 4357472
563028 4357448
563017 4357448
'ECTG' 1 56.3
4 13.716
563019 4357506
563026 4357506
563026 4357475
563019 4357475
'EIntake' 1 56.1
4 17.0688
563016 4357516
563029 4357516
563029 4357511
563016 4357511
'FinFan' 1 59.7
6 7.62
563015 4357389
563052 4357390
563052 4357381
563044 4357380

563044		4357372		
563015		4357371		
'FWTank'	1		55.3	
32	12.192			
562874.62		4357324.00		
562874.47		4357325.49		
562874.04		4357326.92		
562873.34		4357328.23		
562872.39		4357329.39		
562871.23		4357330.34		
562869.92		4357331.04		
562868.49		4357331.47		
562867.00		4357331.62		
562865.51		4357331.47		
562864.08		4357331.04		
562862.77		4357330.34		
562861.61		4357329.39		
562860.66		4357328.23		
562859.96		4357326.92		
562859.53		4357325.49		
562859.38		4357324.00		
562859.53		4357322.51		
562859.96		4357321.08		
562860.66		4357319.77		
562861.61		4357318.61		
562862.77		4357317.66		
562864.08		4357316.96		
562865.51		4357316.53		
562867.00		4357316.38		
562868.49		4357316.53		
562869.92		4357316.96		
562871.23		4357317.66		
562872.39		4357318.61		
562873.34		4357319.77		
562874.04		4357321.08		
562874.47		4357322.51		
'DeMin'	1		56.1	
32	12.192			
562894.33		4357326.00		
562894.23		4357327.04		
562893.93		4357328.04		
562893.44		4357328.96		
562892.77		4357329.77		
562891.96		4357330.44		
562891.04		4357330.93		
562890.04		4357331.23		
562889.00		4357331.33		
562887.96		4357331.23		
562886.96		4357330.93		
562886.04		4357330.44		
562885.23		4357329.77		
562884.56		4357328.96		
562884.07		4357328.04		
562883.77		4357327.04		
562883.67		4357326.00		
562883.77		4357324.96		
562884.07		4357323.96		
562884.56		4357323.04		
562885.23		4357322.23		
562886.04		4357321.56		
562886.96		4357321.07		
562887.96		4357320.77		
562889.00		4357320.67		
562890.04		4357320.77		
562891.04		4357321.07		
562891.96		4357321.56		
562892.77		4357322.23		
562893.44		4357323.04		
562893.93		4357323.96		
562894.23		4357324.96		
16				
'WCTG	1	56.9976	42.672	562979.
'ECTG	1	56.9976	42.672	563024.
'AUXBOIL	1	56.7	10.668	562971.
'FWPUMP	1	55.9	3.048	562870.

BEE-Line Software Version: 5.13

Input File - RCPP.GPW
 Input File - RCPP.PIP
 Output File - RCPP.TAB
 Output File - RCPP.SUM
 Output File - RCPP.SO

BPIP (Dated: 95086)

DATE : 5/ 9/ 1

TIME : 18:43: 0

E:\Reliant\Colusa\Rcpp.bst BEESTWin GEP Files 5/9/2001 6:42:59 PM

BPIP PROCESSING INFORMATION:

The ST flag has been set for processing for an ISCST2 run.

Inputs entered in METERS will be converted to meters using
a conversion factor of 1.0000. Output will be in meters.

The UTMP variable is set to UTMY. The input is assumed to be in
UTM coordinates. BPIP will move the UTM origin to the first pair of
UTM coordinates read. The UTM coordinates of the new origin will
be subtracted from all the other UTM coordinates entered to form
this new local coordinate system.

Plant north is set to 0.00 degrees with respect to True North.

E:\Reliant\Colusa\Rcpp.bst BEESTWin GEP Files 5/9/2001 6:42:59 PM

PRELIMINARY* GEP STACK HEIGHT RESULTS TABLE
(Output Units: meters)

Stack Name	Stack Height	Stack-Building Base Elevation Differences	GEP** EQN1	Preliminary GEP Stack Height Value
WCTG	42.67	0.10	76.10	76.10
ECTG	42.67	0.10	76.10	76.10
AUXBOIL	10.67	-0.20	76.40	76.40
FUPUMP	3.05	-1.00	77.20	77.20

* Results are based on Determinants 1 & 2 on pages 1 & 2 of the GEP Technical Support Document. Determinant 3 may be investigated for additional stack height credit. Final values result after Determinant 3 has been taken into consideration.

** Results were derived from Equation 1 on page 6 of GEP Technical Support Document. Values have been adjusted for any stack-building base elevation differences.

Note: Criteria for determining stack heights for modeling emission limitations for a source can be found in Table 3.1 of the GEP Technical Support Document.

BPIP (Dated: 95086)

DATE : 5/ 9/ 1

TIME : 18:43: 0

E:\Reliant\Colusa\Rcpp.bst BEESTWin GEP Files 5/9/2001 6:42:59 PM

BPIP output is in meters

SO BUILDHGT WCTG	20.73	20.73	24.38	24.38	24.38	24.38
SO BUILDHGT WCTG	24.38	24.38	24.38	30.48	30.48	30.48
SO BUILDHGT WCTG	30.48	30.48	30.48	20.73	20.73	24.38
SO BUILDHGT WCTG	20.73	20.73	24.38	24.38	24.38	24.38
SO BUILDHGT WCTG	24.38	24.38	24.38	24.38	24.38	24.38
SO BUILDHGT WCTG	24.38	24.38	30.48	20.73	20.73	24.38
SO BUILDWID WCTG	18.30	25.04	19.53	21.28	21.63	21.95
SO BUILDWID WCTG	22.56	21.61	20.00	96.97	103.98	107.84
SO BUILDWID WCTG	108.43	105.72	99.79	25.04	18.30	11.00
SO BUILDWID WCTG	18.30	25.04	19.53	21.28	21.63	21.95
SO BUILDWID WCTG	22.56	21.61	20.00	21.61	22.56	22.82
SO BUILDWID WCTG	22.39	21.28	99.79	25.04	18.30	11.00
SO BUILDHGT ECTG	20.73	20.73	24.38	24.38	24.38	24.38

SO	BUILDHGT	ECTG	24.38	24.38	24.38	30.48	30.48	30.48
SO	BUILDHGT	ECTG	30.48	24.38	24.38	20.73	20.73	24.38
SO	BUILDHGT	ECTG	20.73	20.73	24.38	24.38	24.38	24.38
SO	BUILDHGT	ECTG	24.38	24.38	24.38	24.38	24.38	24.38
SO	BUILDHGT	ECTG	24.38	24.38	24.38	20.73	20.73	24.38
SO	BUILDWID	ECTG	18.13	24.70	19.03	20.64	21.63	21.95
SO	BUILDWID	ECTG	21.62	21.61	20.00	96.97	103.98	107.84
SO	BUILDWID	ECTG	108.43	20.64	19.03	25.04	18.30	11.00
SO	BUILDWID	ECTG	18.13	24.70	19.03	20.64	21.63	21.95
SO	BUILDWID	ECTG	21.62	21.61	19.00	21.61	22.56	21.95
SO	BUILDWID	ECTG	21.63	20.64	19.03	25.04	18.30	11.00
SO	BUILDHGT	AUXBOIL	20.73	20.73	24.38	24.38	24.38	24.38
SO	BUILDHGT	AUXBOIL	7.62	0.00	0.00	0.00	30.48	30.48
SO	BUILDHGT	AUXBOIL	30.48	30.48	30.48	20.73	20.73	24.38
SO	BUILDHGT	AUXBOIL	20.73	20.73	24.38	24.38	24.38	24.38
SO	BUILDHGT	AUXBOIL	24.38	24.38	0.00	0.00	0.00	7.62
SO	BUILDHGT	AUXBOIL	7.62	7.62	20.73	20.73	20.73	24.38
SO	BUILDWID	AUXBOIL	18.30	25.04	19.53	21.28	22.39	22.82
SO	BUILDWID	AUXBOIL	44.36	0.00	0.00	0.00	103.98	107.84
SO	BUILDWID	AUXBOIL	108.43	105.72	99.79	25.04	18.30	11.00
SO	BUILDWID	AUXBOIL	18.30	25.04	19.53	21.28	21.63	21.95
SO	BUILDWID	AUXBOIL	21.62	20.62	0.00	0.00	0.00	53.88
SO	BUILDWID	AUXBOIL	59.89	64.08	31.03	25.04	18.30	11.00
SO	BUILDHGT	FWPUMP	12.19	12.19	12.19	12.19	12.19	0.00
SO	BUILDHGT	FWPUMP	0.00	0.00	0.00	0.00	12.19	12.19
SO	BUILDHGT	FWPUMP	12.19	12.19	12.19	30.48	30.48	30.48
SO	BUILDHGT	FWPUMP	30.48	30.48	12.19	12.19	12.19	0.00
SO	BUILDHGT	FWPUMP	0.00	0.00	0.00	0.00	12.19	12.19
SO	BUILDHGT	FWPUMP	12.19	12.19	12.19	12.19	12.19	12.19
SO	BUILDWID	FWPUMP	34.26	32.93	30.98	28.47	25.51	0.00
SO	BUILDWID	FWPUMP	0.00	0.00	0.00	0.00	22.35	25.66
SO	BUILDWID	FWPUMP	28.58	31.04	32.98	90.84	79.12	65.00
SO	BUILDWID	FWPUMP	76.80	88.27	30.98	28.47	25.51	0.00
SO	BUILDWID	FWPUMP	0.00	0.00	0.00	0.00	22.35	25.66
SO	BUILDWID	FWPUMP	28.58	31.04	32.98	34.30	34.96	34.95

APPENDIX G7

CONSTRUCTION IMPACTS MODELING FILES

**(Data Files Available on CD-ROM:
“Air Quality and Public Health Modeling Files”)**

APPENDIX G8

OPERATING IMPACTS MODELING FILES

**(Data Files Available on CD-ROM:
“Air Quality and Public Health Modeling Files”)**

APPENDIX G9

VISIBILITY CALCULATIONS

Yollabol.txt

Level I Visual Effects Screening Analysis for
Source: Colusa Power Plant
Class I Area: Yolla Bolly Middle Eel

*** Level-1 Screening ***

Input Emissions for

Particulates	4.01	G	/S
NOx (as NO ₂)	4.73	G	/S
Primary NO ₂	.00	G	/S
Soot	.00	G	/S
Primary SO ₄	.00	G	/S

***** Default Particle Characteristics Assumed

Transport Scenario Specifications:

Background Ozone:	.04	ppm
Background Visual Range:	279.00	km
Source-Observer Distance:	88.00	km
Min. Source-Class I Distance:	88.00	km
Max. Source-Class I Distance:	112.00	km
Plume-Source-Observer Angle:	11.25	degrees
Stability:	6	
Wind Speed:	1.00	m/s

R E S U L T S

Asterisks (*) indicate plume impacts that exceed screening criteria

Maximum Visual Impacts INSIDE Class I Area
Screening Criteria ARE Exceeded

Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Delta E	Contrast
=====	=====	=====	=====	=====	=====	=====	=====	=====
SKY	10.	135.	112.0	34.	2.00	1.690	.05	.036
SKY	140.	135.	112.0	34.	2.00	.247	.05	-.008
TERRAIN	10.	84.	88.0	84.	2.00	2.708*	.05	.025
TERRAIN	140.	84.	88.0	84.	2.00	.120	.05	.002

Maximum Visual Impacts OUTSIDE Class I Area
Screening Criteria ARE Exceeded

Delta E Contrast

Yollabol.txt

Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Crit	Plume
=====	=====	=====	=====	=====	=====	=====	=====	=====
SKY	10.	0.	1.0	169.	5.76	33.246*	.14	.621*
SKY	140.	0.	1.0	169.	4.08	5.658*	.14	-.120
TERRAIN	10.	5.	27.4	164.	2.00	7.428*	.05	.080*
TERRAIN	140.	5.	27.4	164.	2.00	1.134	.05	.023

Yolla2.txt

Level II Visual Effects Screening Analysis for
Source: Colusa Power Plant
Class I Area: Yolla Bolly Middle Eel

*** User-selected Screening Scenario Results ***

Input Emissions for

Particulates	4.01	G	/S
NOx (as NO2)	4.73	G	/S
Primary NO2	.00	G	/S
Soot	.00	G	/S
Primary SO4	.00	G	/S

PARTICLE CHARACTERISTICS

Density	Diameter
=====	=====

Primary Part.	2.5	6
Soot	2.0	1
Sulfate	1.5	4

Transport Scenario Specifications:

Background Ozone:	.04	ppm
Background Visual Range:	279.00	km
Source-Observer Distance:	88.00	km
Min. Source-Class I Distance:	88.00	km
Max. Source-Class I Distance:	112.00	km
Plume-Source-Observer Angle:	11.25	degrees
Stability:	6	
Wind Speed:	3.00	m/s

R E S U L T S

Asterisks (*) indicate plume impacts that exceed screening criteria

Maximum Visual Impacts INSIDE Class I Area
Screening Criteria ARE NOT Exceeded

Backgrnd	Theta	Azi	Distance	Alpha	Crit	Delta E	Contrast
=====	=====	=====	=====	=====	=====	=====	=====
SKY	10.	135.	112.0	34.	2.00	1.464	.05 .031
SKY	140.	135.	112.0	34.	2.00	.213	.05 -.007
TERRAIN	10.	84.	88.0	84.	2.00	1.875	.05 .017
TERRAIN	140.	84.	88.0	84.	2.00	.081	.05 .001

Yolla2.txt

Maximum Visual Impacts OUTSIDE Class I Area
Screening Criteria ARE Exceeded

Backgrnd	Theta	Azi	Distance	Alpha	Delta E		Contrast	
					Crit	Plume	Crit	Plume
SKY	10.	0.	1.0	169.	5.76	14.880*	.14	.247*
SKY	140.	0.	1.0	169.	4.08	2.260	.14	-.052
TERRAIN	10.	0.	1.0	169.	5.10	9.702*	.14	.106
TERRAIN	140.	0.	1.0	169.	3.72	2.455	.14	.047

APPENDIX G10

COMMISSIONING IMPACTS MODELING FILES

**BEE-Line Software: BEEST for Windows (Version 8.14) data input file
 ** Model: ISCST3 File Creation Date: 5/14/01 Time: 5:45:34 PM
 NO ECHO

*** Message Summary For ISC3 Model Setup ***

----- Summary of Total Messages -----

A Total of	0 Fatal Error Message(s)
A Total of	1 Warning Message(s)
A Total of	0 Informational Message(s)

***** FATAL ERROR MESSAGES *****
 *** NONE ***

***** WARNING MESSAGES *****
 SO W320 61 PPARM :Input Parameter May Be Out-of-Range for Parameter VS

 *** SETUP Finishes Successfully ***

*** ISCST3 - VERSION 00101 ***	*** Reliant - Colusa Power Plant	***	05/31/01
	*** Commissioning	***	12:34:44
**MODELOPTS:		PAGE	1

CONC	RURAL	ELEV	DFAULT
------	-------	------	--------

*** MODEL SETUP OPTIONS SUMMARY ***

**Intermediate Terrain Processing is Selected

**Model Is Setup For Calculation of Average CONCcentration Values.

-- SCAVENGING/DEPOSITION LOGIC --
 **Model Uses NO DRY DEPLETION. DDPLET = F
 **Model Uses NO WET DEPLETION. WDPLET = F
 **NO WET SCAVENGING Data Provided.
 **NO GAS DRY DEPOSITION Data Provided.
 **Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations

**Model Uses RURAL Dispersion.

**Model Uses Regulatory DEFAULT Options:

1. Final Plume Rise.
2. Stack-tip Downwash.
3. Buoyancy-induced Dispersion.
4. Use Calms Processing Routine.
5. Not Use Missing Data Processing Routine.
6. Default Wind Profile Exponents.
7. Default Vertical Potential Temperature Gradients.
8. "Upper Bound" Values for Supersquat Buildings.
9. No Exponential Decay for RURAL Mode

**Model Accepts Receptors on ELEV Terrain.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates 1 Short Term Average(s) of: 8-HR

**This Run Includes: 4 Source(s); 1 Source Group(s); and 11893 Receptor(s)

**The Model Assumes A Pollutant Type of: CO8

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:

Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
 m for Missing Hours
 b for Both Calm and Missing Hours

**Misc. Inputs: Anem. Hgt. (m) = 10.00 ; Decay Coef. = 0.000 ; Rot. Angle = 0.0
 Emission Units = GRAMS/SEC ; Emission Rate Unit Factor = 0.10000E+07
 Output Units = MICROGRAMS/M**3

**Approximate Storage Requirements of Model = 1.9 MB of RAM.

**Input Runstream File: 99_co8.dta

**Output Print File: 99CO8.1st

*** ISCST3 - VERSION 00101 *** *** Reliant - Colusa Power Plant
*** Commissioning *** 05/31/01
*** MODEL OPTS:
CONC RURAL ELEV DFAULT *** 12:34:44
 *** PAGE 2

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER CATS.	EMISSION RATE PART. (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV.	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	STACK EXISTS (METERS)	BUILDING SCALAR BY	EMISSION RATE VARY BY
WCTG	0	0.14801E+02	562979.0	4357424.0	57.0	45.72	357.59	17.89	5.79		YES	
ECTG	0	0.14801E+02	563024.0	4357425.0	57.0	45.72	357.59	17.89	5.79		YES	
AUXBOIL	0	0.18648E+00	562971.0	4357410.0	56.7	10.67	438.15	33.01	0.61		YES	
FWPUMP	0	0.22050E+00	562870.0	4357342.0	55.9	3.05	716.48	67.11	0.15		YES	

*** ISCST3 - VERSION 00101 *** *** Reliant - Colusa Power Plant
*** Commissioning *** 05/31/01
*** MODEL OPTS:
CONC RURAL ELEV DFAULT *** 12:34:44
 *** PAGE 3

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
ALL	WCTG , ECTG , AUXBOIL , FWPUMP ,

*** ISCST3 - VERSION 00101 *** *** Reliant - Colusa Power Plant
*** Commissioning *** 05/31/01
*** MODEL OPTS:
CONC RURAL ELEV DFAULT *** 12:34:44
 *** PAGE 4

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: WCTG

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK				
1	20.7,	18.3,	0	2	20.7,	25.0,	0	3	24.4,	19.5,	0	4	24.4,	21.3,	0	5	24.4,	21.6,	0	6	24.4,	22.0,	0
7	24.4,	22.6,	0	8	24.4,	21.6,	0	9	24.4,	20.0,	0	10	30.5,	97.0,	0	11	30.5,	104.0,	0	12	30.5,	107.8,	0
13	30.5,	108.4,	0	14	30.5,	105.7,	0	15	30.5,	99.8,	0	16	20.7,	25.0,	0	17	20.7,	18.3,	0	18	24.4,	11.0,	0
19	20.7,	18.3,	0	20	20.7,	25.0,	0	21	24.4,	19.5,	0	22	24.4,	21.3,	0	23	24.4,	21.6,	0	24	24.4,	22.0,	0
25	24.4,	22.6,	0	26	24.4,	21.6,	0	27	24.4,	20.0,	0	28	24.4,	21.6,	0	29	24.4,	22.6,	0	30	24.4,	22.8,	0
31	24.4,	22.4,	0	32	24.4,	21.3,	0	33	30.5,	99.8,	0	34	20.7,	25.0,	0	35	20.7,	18.3,	0	36	24.4,	11.0,	0

SOURCE ID: ECTG

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK				
1	20.7,	18.1,	0	2	20.7,	24.7,	0	3	24.4,	19.0,	0	4	24.4,	20.6,	0	5	24.4,	21.6,	0	6	24.4,	22.0,	0
7	24.4,	21.6,	0	8	24.4,	21.6,	0	9	24.4,	20.0,	0	10	30.5,	97.0,	0	11	30.5,	104.0,	0	12	30.5,	107.8,	0
13	30.5,	108.4,	0	14	24.4,	20.6,	0	15	24.4,	19.0,	0	16	20.7,	25.0,	0	17	20.7,	18.3,	0	18	24.4,	11.0,	0
19	20.7,	18.1,	0	20	20.7,	24.7,	0	21	24.4,	19.0,	0	22	24.4,	20.6,	0	23	24.4,	21.6,	0	24	24.4,	22.0,	0
25	24.4,	21.6,	0	26	24.4,	21.6,	0	27	24.4,														

SOURCE ID: AUXBOIL

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK				
1	20.7,	18.3,	0	2	20.7,	25.0,	0	3	24.4,	19.5,	0	4	24.4,	21.3,	0	5	24.4,	22.4,	0	6	24.4,	22.8,	0
7	7.6,	44.4,	0	8	0.0,	0.0,	0	9	0.0,	0.0,	0	10	0.0,	0.0,	0	11	30.5,	104.0,	0	12	30.5,	107.8,	0
13	30.5,	108.4,	0	14	30.5,	105.7,	0	15	30.5,	99.8,	0	16	20.7,	25.0,	0	17	20.7,	18.3,	0	18	24.4,	11.0,	0
19	20.7,	18.3,	0	20	20.7,	25.0,	0	21	24.4,	19.5,	0	22	24.4,	21.3,	0	23	24.4,	21.6,	0	24	24.4,	22.0,	0
25	24.4,	21.6,	0	26	24.4,	20.6,	0	27	0.0,	0.0,	0	28	0.0,	0.0,	0	29	0.0,	0.0,	0	30	7.6,	53.9,	0
31	7.6,	59.9,	0	32	7.6,	64.1,	0	33	20.7,	31.0,	0	34	20.7,	25.0,	0	35	20.7,	18.3,	0	36	24.4,	11.0,	0

SOURCE ID: FWPUMP

IFV	BH	BW	WAK																				
1	12.2,	34.3,	0	2	12.2,	32.9,	0	3	12.2,	31.0,	0	4	12.2,	28.5,	0	5	12.2,	25.5,	0	6	0.0,	0.0,	0
7	0.0,	0.0,	0	8	0.0,	0.0,	0	9	0.0,	0.0,	0	10	0.0,	0.0,	0	11	12.2,	22.4,	0	12	12.2,	25.7,	0
13	12.2,	28.6,	0	14	12.2,	31.0,	0	15	12.2,	33.0,	0	16	30.5,	90.8,	0	17	30.5,	79.1,	0	18	30.5,	65.0,	0
19	30.5,	76.8,	0	20	30.5,	88.3,	0	21	12.2,	31.0,	0	22	12.2,	28.5,	0	23	12.2,	25.5,	0	24	0.0,	0.0,	0
25	0.0,	0.0,	0	26	0.0,	0.0,	0	27	0.0,	0.0,	0	28	0.0,	0.0,	0	29	12.2,	22.4,	0	30	12.2,	25.7,	0
31	12.2,	28.6,	0	32	12.2,	31.0,	0	33	12.2,	33.0,	0	34	12.2,	34.3,	0	35	12.2,	35.0,	0	36	12.2,	35.0,	0

*** ISCST3 - VERSION 00101 *** *** Reliant - Colusa Power Plant
 *** Commissioning

**MODELOPTS:
CONC

RURAL ELEV DFAULT

*** 05/31/01
 12:34:44
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*** THE SUMMARY OF HIGHEST 8-HR RESULTS ***

** CONC OF CO8 IN MICROGRAMS/M**3

GROUP ID		AVERAGE CONC (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWORK	
					DATE	GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	111.78326c ON 99100316: AT (562744.00, 4357465.00,	60.00,	0.00)	DC	NA
	HIGH 2ND HIGH VALUE IS	83.42680 ON 99100416: AT (562744.12, 4357435.50,	59.10,	0.00)	DC	NA

*** RECEPTOR TYPES: GC = GRIDCART
 GP = GRIDPOLR
 DC = DISCCART
 DP = DISCPOLR
 BD = BOUNDARY